

WATER PERMIT NO. 8497-3

Name of Applicant: City of Sioux Falls

Address: 2100 N Minnesota Ave, Sioux Falls SD

Phone: 605 373-6940

Amount of Water Claimed: no add'l

Total Acres: NA

Source of Water Supply: groundwater (1 well)

Water to be used for: municipal

County: Minnehaha

Type of Waste Disposal System:

Location: 1/2 mile north of Renner

PRIORITY

Date Received: 2-23-21

Application/License Fee: \$ 300

Corrected Application Received: 3-8-21

Period of Annual Use: January 1 – December 31

Remarks: Change location of diversion point from No. 1347-3 and 4101-3

Diversion Point: SE 1/4 NW 1/4 Sec 9-T102N-
R49W

Land to be Irrigated: NA

Depth of Well: 37 feet

Well Driller:

Remarks:

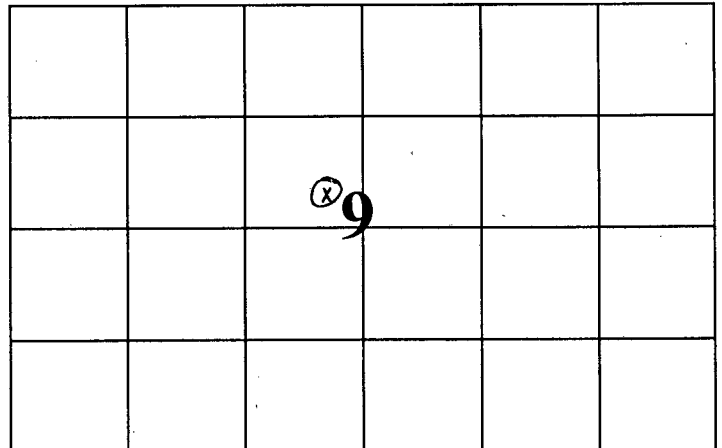
Type of Map: aerial

Prepared by:

Reviewed and the Number Assigned on: 3-8-21

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



SOUTH DAKOTA
WATER PERMIT NO. 8497-3

Date of first receipt of application February 23, 2021.

Date of return to applicant for corrections, amendments or changes February 24, 2021.

Date of receipt of corrected application March 5, 2021.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 8497-3 to City of Sioux Falls Water Division, 2100 N Minnesota Ave, Sioux Falls SD 57104 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 8497-3 transfers water appropriated under existing Water Right Nos. 1347-3 and 4101-3 held by the City of Sioux Falls to a new collector well. Water Right No. 1347-3 authorizes use of 2,844 acre-feet of water annually at a maximum pump rate of 5.913 cubic feet of water per second (cfs) from one well completed into the Big Sioux: Sioux Falls aquifer located in the SW 1/4 SW 1/4 Section 4-T101N-R49W. Water Right No. 4101-3 authorizes a maximum pump rate of 1.0 cfs from one well completed into the Big Sioux: Sioux Falls aquifer located in the SE 1/4 SW 1/4 Section 16-T102N-R49W. This permit transfers the 1.00 cfs diversion rate, equating to 724 acre-feet (AF) of water annually, authorized by No. 4101-3 and 3.927 cfs and 1,876 acre-feet annually authorized by No. 1347-3 for a total diversion authority transfer of 4.927 cfs and 2,600 acre-feet annually. The site for the new collector well is located in the SE 1/4 NW 1/4 Section 9-T102N-R49W approximately one-half mile north of Renner SD and will be completed into the Big Sioux: Sioux Falls aquifer.
2. The water appropriated shall be used for the purpose of municipal use and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 8497-3 is May 24, 2021.
5. The date from which applicant may claim right is April 8, 1957 (No. 4101-3 for 1.0 cfs & 724 AF) and (No. 1347-3 for 3.927 cfs & 1,876 AF).
6. One-fifth of the construction is to be completed on or before November 24, 2023.
7. All construction is to be completed on or before May 24, 2026.
8. Water is to be put to beneficial use on or before May 24, 2030.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

(continued)

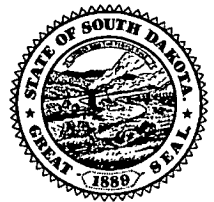
2. The well authorized by Permit No. 8497-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. The permit holder shall report to the Chief Engineer annually the amount of water withdrawn from the Big Sioux: Sioux Falls aquifer.
4. Water Permit No. 8497-3 authorizes a total annual diversion of 2,600 acre-feet of water.

WATER MANAGEMENT BOARD

By: Eric Gronlund
Eric Gronlund, Chief Engineer
Water Rights Program
Department of Agriculture and Natural Resources

JUL 06 2021

date



Emailed

RECEIVED

FEB 23 2021

WATER RIGHTS
PROGRAM

Mail to: DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>8497-3</u> (office use only)
	Hydrologic Unit <u>10170203</u>
	Basin <u>Sioux River</u>
	Newspaper <u>Argus Leader</u> <u>Sioux Valley News</u>

Application For Permit To Appropriate Water Within The State Of South Dakota

Check use(s) of water:

☒ Municipal	☐ Water Distribution System	☐ Recreational	☐ Institutional
☐ Rural Water System	☐ Commercial	☐ Fish & Wildlife	☐ Geothermal
☐ Domestic (over 18 gpm)	☐ Industrial	☐ Other _____	

Type of Application: (check one)

☐ New	☐ Vested Right (Use predates Mar 2, 1955)	☐ Future Use Reservation
☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____		
☐ Amendment/Correction to Permit No. _____		

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)

Change Diversion points from Permit #1347-3 and ~~4103-3~~ 4101-31. Name to Appear on Water Permit City of Sioux Falls Water Division
 Mailing Address 2100 N Minnesota Ave Sioux Falls SD 57104
 (Address) (City) (State) (Zip Code)

 Phone 605-373-6940 Mobile _____ Email ggraverson@siouxfalls.org

 2. Amount of water claimed 4.927 *CFS or _____ **GPM and 2600 ***AF or _____ Gallons
 Flow rate and volume are both required. (*Cubic Feet per Second) (**Gallons per Minute) (***Acre Feet - storage capacity of dam/dugout or annual use)
3. Source of water supply 3.927 CFS from 1347-3 & 1 CFS ~~4103-3~~ 4101-3
 4. Location of point of diversion 1 Well in SE 1/4 NW 1/4 Section 9 T102 N, R49W County Minnehaha
 (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W)
If not a public water supply (e.g. municipal), will water be used outside of the area described above? ☐ Yes ☐ No

If "Yes," where will water be used? _____

(example - NW1/4 section 12-T104N-R53W)

5. County or counties where water will be used Minnehaha, Lincoln6. Annual period during which water is to be used January 1 to December 31st

7. Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

Installation of new collector well
 I, Gavin M. Graverson Water Superintendent, the applicant, certify under
 Name of Person Title (if applicable)

penalty of perjury that I have read this application, examined the attached map, and that the matters stated are true. I further certify, if acting on behalf of an entity or individual other than myself, that I am authorized to submit this application.



Technical Memorandum

To: Gavin Graverson, City of Sioux Falls
From: LRE Water & HR Green, Inc.
Copy to: Ted Lewis, Tim Stefanich, Kurt Anderson, Nick Borns
Date: December 14, 2020
Project: Sioux Falls Well #72
Subject: Water Permit Application Amounts – Well 72

The purpose of this Technical Memorandum is to provide information to assist the City in applying for a water permit authorizing withdrawals from the Big Sioux aquifer at the Renner Well Field. It is assumed that the water permit application will be for withdrawals associated with Well #72, a horizontal collector well (HCW) planned for the southeast corner of the Renner Well Field property.

LRE Water (LRE) and HR Green, Inc. (HR Green) provided the United States Geological Survey (USGS) with six different conceptual well field designs (conceptual designs). The USGS used the existing Big Sioux Aquifer MODFLOW groundwater flow model (USGS model), described in Davis, et. al., 2019, to simulate the six conceptual designs and provided relative groundwater production potentials after pumping for 120 days (Volkman, 2020). Additionally, LRE completed analytical modeling using a proprietary GIS-based tool (Tool) to estimate cumulative drawdown and potential yield for each conceptual design after pumping for 100 days and to provide a secondary estimate for comparison with the USGS model. Specific details regarding the Model and Tool are not provided herein as they have been provided in previous project meetings. The estimated yields for the individual well types, based on the Model and Tool simulations, and also based on well drilling contractor estimates, LRE's professional judgement, and information included in a summary of the City's existing horizontal collector wells, are shown in the table below.

Well Type	Estimated Yield (gpm) LRE Tool	Estimated Yield (gpm) USGS Model	Best Estimate (gpm)
Horizontal Collector Well	1,040 – 1,450	350 to 600	850
Horizontal Directionally Drilled Well	1,010 – 1,400	250 to 450	450
Vertical Well	410 – 665	150 to 350	250

This information was also provided in a table that was included in the November 17, 2020 project meeting presentation. A copy of that table is attached.

The estimated yields are based on modeled or calculated yields after 100 to 120 days of pumping. The short-term, instantaneous well yield from a single HCW could be greater, perhaps as much as 2,000 gpm. Adding 25-percent to that number to account for uncertainty results in a maximum instantaneous pumping rate of approximately 2,500 gpm, which is equivalent to 3.6 million gallons per day (MGD).

The water permit application also requires an annual requested volume. If it is assumed that Well #72 will be in use approximately 60% of the year, this equates to an annual withdrawal volume of approximately 2,420 acre-feet per year, which is equivalent to a continuous pumping rate of approximately 2.16 MGD.

Based on the above-described assumptions and data, the amount of water claimed in the water permit application for Well #72 would be a maximum diversion rate of 2,500 gpm with an annual use of 2,420 acre-feet.

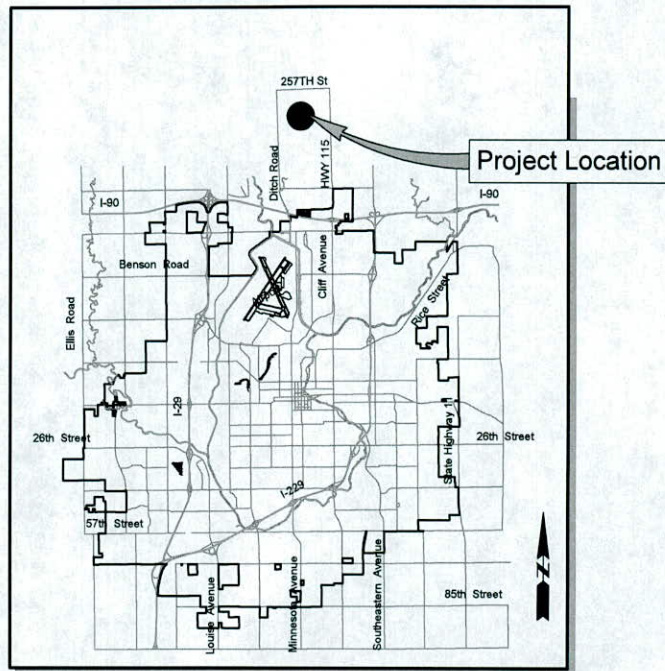
The soonest this permit could potentially be approved is likely the March 2021 Water Management Board meeting (assuming it is not contested). It should be noted that South Dakota laws require that the diversion points (wells) associated with a water permit application be constructed within 5 years of the water permit approval date. If it is intended to add additional wells to the Renner Well Field within five years of March 2021, then the City may want to consider increasing the diversion rate and annual volume in the water permit application.

References Cited

Davis, K.W., Eldridge, W.G., Valder, J.F., and Valseth, K.J., 2019. Groundwater-flow model and analysis of groundwater and surface-water interactions for the Big Sioux Aquifer, Sioux Falls, South Dakota: U.S. Geological Survey Scientific Investigations Report 2019-5117, 86 p., <https://doi.org/10.3133/sir20195117>.

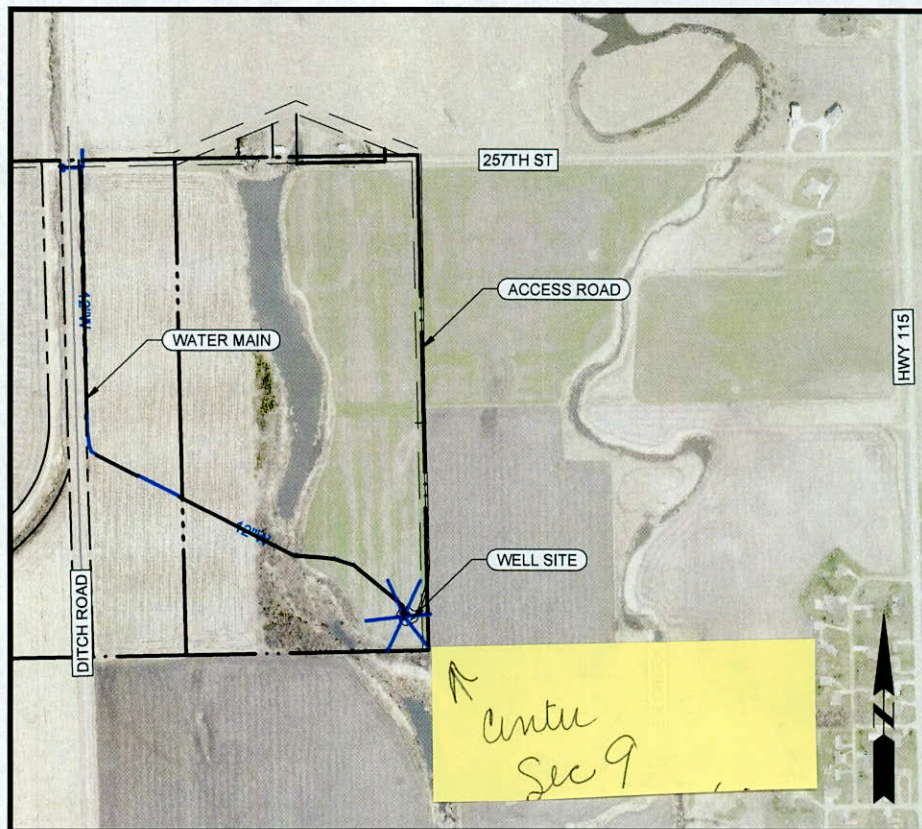
Volkman, Eric, 2020. Letter to Mr. Nick Borns of the City of Sioux Falls, with preliminary results and provisional figures, tables, and analysis from scenario testing the groundwater flow model with several conceptual designs consisting of various combinations of collector wells, horizontally drilled wells, and vertical wells. Dated October 30, 2020.

CITY OF SIOUX FALLS WELL 72 PROJECT LOCATION MAP



VICINTY MAP

SCALE: NONE



LOCATION MAP

SCALE: 1" = 1000'

- Site Monitoring Well
- New Well Property
- Proposed Alternate HCW Soil Boring Location
- Proposed Collector Well Caisson
- Proposed Collector Well Blank
- Proposed Collector Well Screen
- Proposed "Original" HCW Soil Boring Location
- Proposed "Original" Collector Well

Proposed Test Hole Name	BLM X Coordinate (feet)	BLM Y Coordinate (feet)
HCW SB-1b	2243066.9	15865530.0
HCW SB-2b	2243239.4	15865530.6
HCW SB-3b	2243214.2	15865836.4
HCW SB-4b	2243093.1	15865584.0
HCW SB-5b	2243191.2	15865586.5
HCW SB-6b	2243175.4	15865755.2
HCW SB-7b	2243043.8	15865687.5

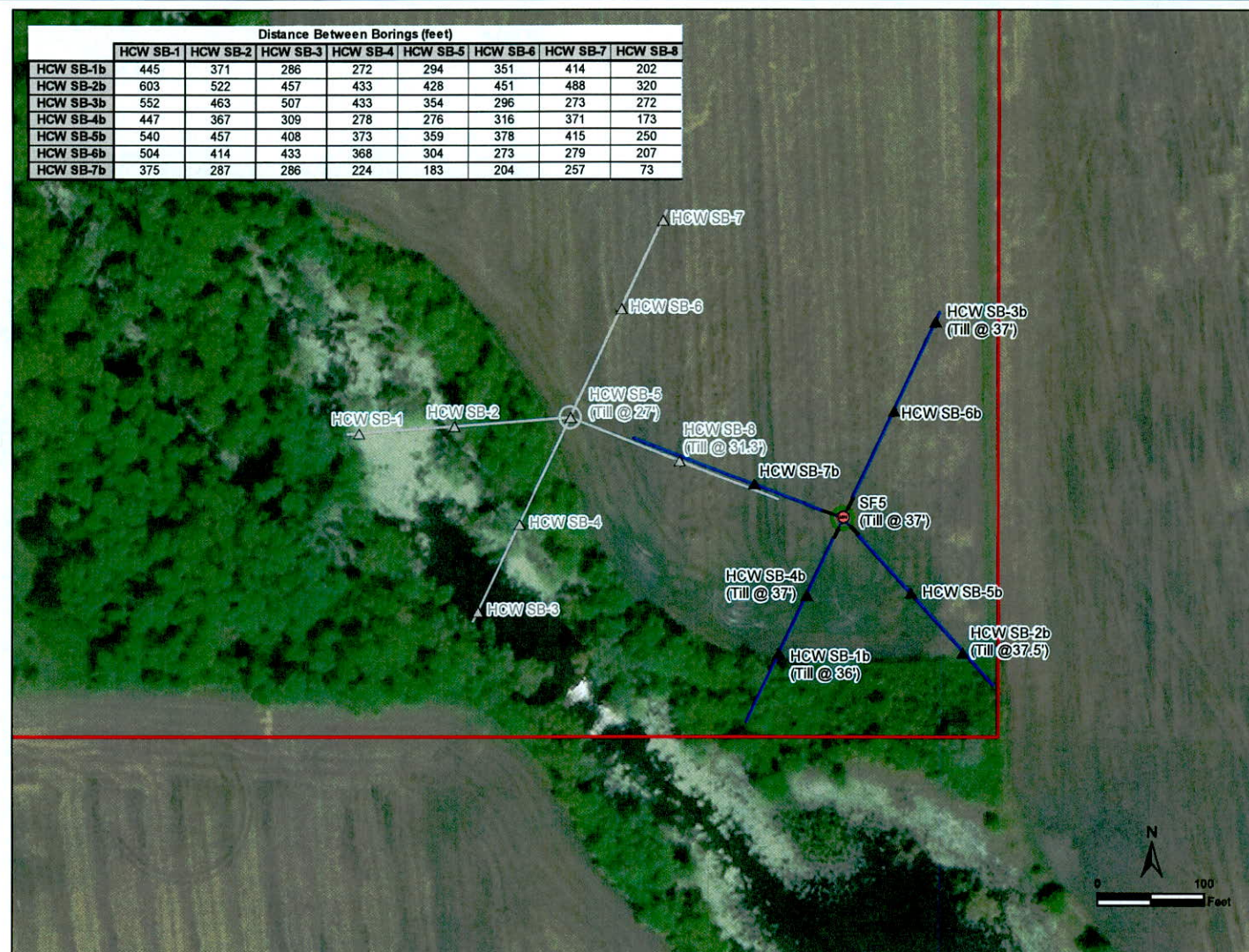
Notes:
 HCW SB: Horizontal Collector Well Soil Boring
 Coordinate system is NAD_1983_BLM_Zone_14N_ftUS

Proposed Test Hole Name	UTM X Coordinate (meters)	UTM Y Coordinate (meters)
HCW SB-1b	683688.2	4835823.2
HCW SB-2b	683740.8	4835823.4
HCW SB-3b	683733.1	4835916.6
HCW SB-4b	683696.1	4835839.7
HCW SB-5b	683726.0	4835840.4
HCW SB-6b	683721.2	4835891.8
HCW SB-7b	683681.1	4835871.2

Notes:
 HCW SB: Horizontal Collector Well Soil Boring
 Coordinate system is NAD_1983_UTM_Zone_14N

Sources:
 Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

	Distance Between Borings (feet)							
	HCW SB-1	HCW SB-2	HCW SB-3	HCW SB-4	HCW SB-5	HCW SB-6	HCW SB-7	HCW SB-8
HCW SB-1b	445	371	286	272	294	351	414	202
HCW SB-2b	603	522	457	433	428	451	488	320
HCW SB-3b	552	463	507	433	354	296	273	272
HCW SB-4b	447	367	309	278	276	316	371	173
HCW SB-5b	540	457	408	373	359	378	415	250
HCW SB-6b	504	414	433	368	304	273	279	207
HCW SB-7b	375	287	286	224	183	204	257	73



Prepared By:
 LRE Water
 Innovative Water Resource Solutions
 South Dakota Office
 Sioux Falls, South Dakota
 (605) 310-1721

HR GREEN, INC. SIOUX FALLS WELL 72 SIOUX FALLS, SOUTH DAKOTA	
PROPOSED SOUTH HORIZONTAL COLLECTOR WELL ALTERNATE SOIL BORING LOCATIONS	
FILE:5507HRG01_Well72_01p_S_HCW_SBs_alt.MXD	DATE: 12/2/2020 FIGURE: 1

D:\GIS\HR Green Sioux Falls SD\maps\5507HRG01 Well72_01s.mxd, 1/15/2021, 3:08:11 PM, NAD 1983 BLM Zone 14N ftUS

-  Municipal Well
-  Main
-  Well Completion Report
-  Observation Well
-  Irrigation Well
-  Well 72
-  New Well Property

Terrain (feet)

-  High : 1,490
-  Low : 1,428



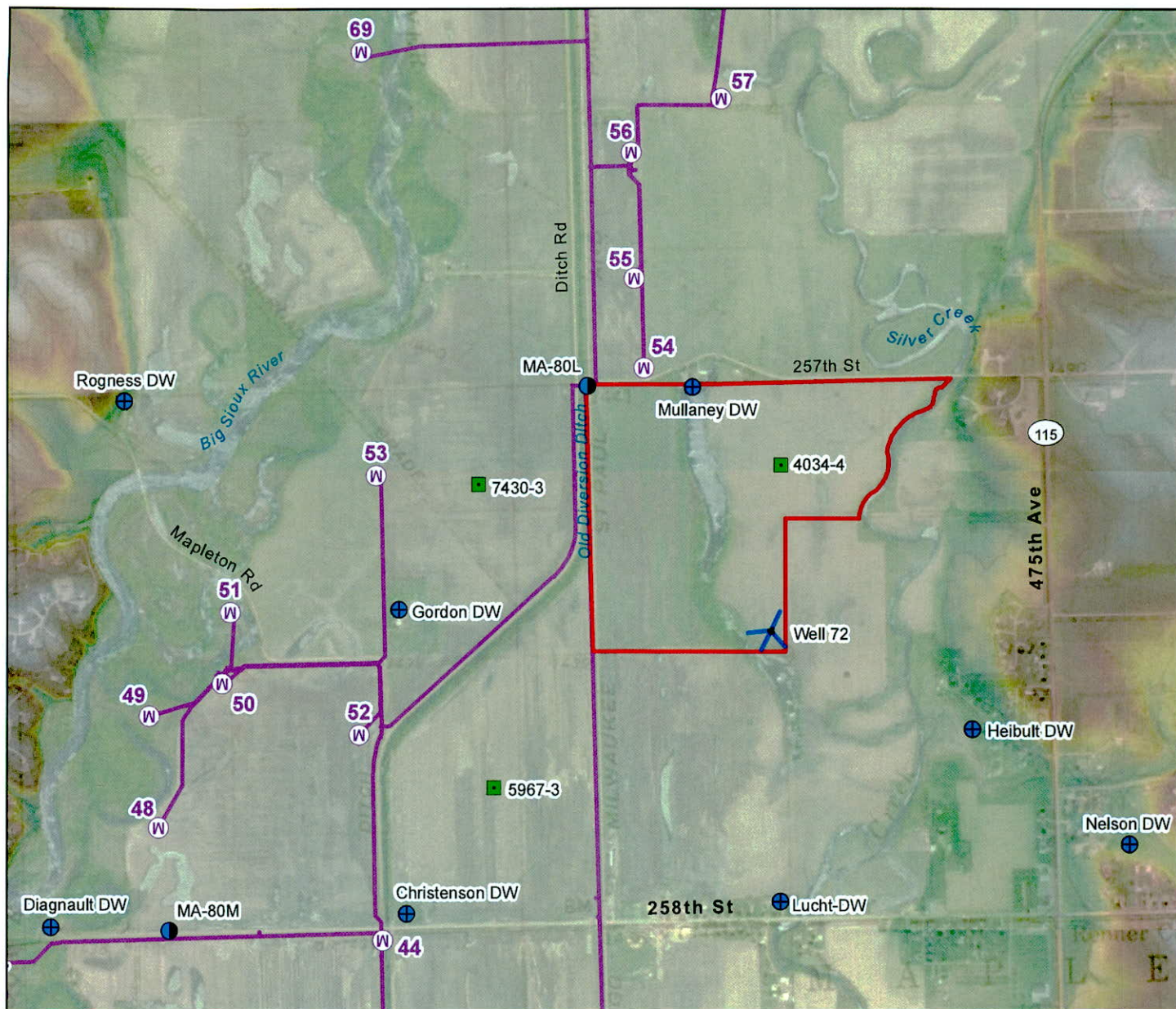
0 1,500
Feet

Notes:

DW = Domestic well, the locations are estimated based on information from SDDENR online water well completion reports database, from aerial images, and from telephone directories.

Sources:

Basemap Service Layer Credits: Terrain, USA_Topo_Maps, World Imagery.
ESRI Terrain, ESRI Streetmap North America 10.2.
SDDENR Observation Well, Water Well Completion Reports, and Lithologic Logs Databases



Prepared By:
LRE Water
Innovative Water Resource Solutions
South Dakota Office
Sioux Falls, South Dakota
(605) 310-1721



HR GREEN, INC.
SIOUX FALLS WELL 72
SIOUX FALLS, SOUTH DAKOTA

WELL 72 LOCATION AND NEARBY DOMESTIC & IRRIGATION WELLS

FILE: 5507HRG01_Well72_01s.MXD

DATE: 1/15/2021

FIGURE: 1

Duvall, Ron

From: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Sent: Tuesday, March 23, 2021 9:30 AM
To: Duvall, Ron
Subject: RE: [EXT] Application for new collector well

Yes we are good with the numbers

Gavin Graverson
Water Superintendent
Public Works



605-373-6940 605-940-0528 ggraverson@siouxfalls.org

www.siouxfalls.org

"Go afield with a good attitude, with respect for the wildlife you hunt and for the forest and fields in which you walk. Immerse yourself in the outdoor experience. It will cleanse your soul and make you a better person" Fred Bear

From: Duvall, Ron <Ron.Duvall@state.sd.us>
Sent: Tuesday, March 23, 2021 9:19 AM
To: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Subject: RE: Application for new collector well

External email - use caution when clicking on links or attachments.

Gavin,

Just want to make sure this request doesn't get overlooked since it was sent late on a Friday and Monday's usually have their own mass of emails clamoring for attention.

Thank you,

Ron

From: Duvall, Ron
Sent: Friday, March 19, 2021 2:03 PM
To: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Subject: RE: [EXT] Application for new collector well

Gavin,

The report and recommendation are all but complete and the public notice which needs to be published will be sent to you and the newspapers soon. There is one point of clarification we would like to make certain we are using the correct numbers. The application specifies 4.927 cfs (2,212 gallons per minute) and a volume of 2,600 acre-feet. A document provided with the application completed by HRGreen dated December 14, 2020, identifies a rate of 2,500 gpm and a volume of 2,420 acre-feet. In the draft report we used the figures on the application and NOT the HRGreen figures. Please confirm the figures to use are 4.927 cfs and 2600 acre-feet. A response to this email will suffice.

Thank you,

Ron Duvall
Water Rights Program
605.773.3352
denr.sd.gov



DENR
SOUTH DAKOTA

From: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Sent: Wednesday, February 24, 2021 1:48 PM
To: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: [EXT] Application for new collector well

Thanks Ron

Gavin Graverson
Water Superintendent
Public Works



605-373-6940 605-940-0528

www.siouxfalls.org

"Go afield with a good attitude, with respect for the wildlife you hunt and for the forest and fields in which you walk. Immerse yourself in the outdoor experience. It will cleanse your soul and make you a better person" Fred Bear

From: Duvall, Ron <Ron.Duvall@state.sd.us>
Sent: Wednesday, February 24, 2021 1:41 PM
To: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Cc: Schlaak, Karen <Karen.Schlaak@state.sd.us>; Gronlund, Eric <Eric.Gronlund@state.sd.us>
Subject: RE: Application for new collector well

External email - use caution when clicking on links or attachments.

Gavin,

A check works for us. Regarding the status of No. 1347-3, here is the info I have:

- Licensed in January 1971 for 7.75 cfs (which equates to a volume of 5,611 acre-feet) – see pages 6 & 7 [1347-3.pdf \(sd.gov\)](#)
- No. 7232-3 (well No. 62), approved in Sept 2011 and licensed in Apr 2014, transferred 1.837 cfs and 1,329 acre-feet from No. 1347-3 – see pages 90 & 91 [7232-3.pdf \(sd.gov\)](#)
 - Remaining on No. 1347-3 was 5.913 cfs (7.75 – 1.837) and 4,282 acre-feet (5,611 – 1,329)
- Nos. 7361-3 and 7362-3, approved Sept 17, 2012 and licensed Sept 6, 2018, transferred a total volume of 1,438 acre-feet from No. 1347-3 (719 acre-feet for each permit – there was no cfs amount deducted, only volume). If a diversion rate had been subtracted based upon approval of Nos. 7361-3 and 7362-3, then you would get the diversion rate figure of 3.927 cfs (5.913 – 1.986) that you came up with – see page 40 [7361-3.pdf \(sd.gov\)](#) and page 38 [7362-3.pdf \(sd.gov\)](#)
 - Remaining on No. 1347-3 is 5.913 cfs and 2,844 acre-feet (4,282 – 1,438) – see page 14 of the reissued licensed [1347-3.pdf \(sd.gov\)](#)

Hopefully, this clears up the confusion as to what the current diversion rate is. If you have any further questions, please let me know.

Thank you,

Ron Duvall
Water Rights Program
605.773.3352
denr.sd.gov



DENR
SOUTH DAKOTA

From: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Sent: Wednesday, February 24, 2021 9:10 AM
To: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: [EXT] Application for new collector well

Thanks Ron!

Yes you are correct it is 4101-3

I show in my records that all we had remaining on Permit 1347-3 was 3.927 as we had transferred in 2011 1.837 CFS to well 62 and .993 CFS to well 32 & well 31 in 2012 leaving us a remainder of 3.927 CFS

With payment can we do it via CC or do you need a check?

Gavin Graverson
Water Superintendent
Public Works



605-373-6940 605-940-0528

www.siouxfalls.org

"Go afield with a good attitude, with respect for the wildlife you hunt and for the forest and fields in which you walk. Immerse yourself in the outdoor experience. It will cleanse your soul and make you a better person" Fred Bear

From: Duvall, Ron <Ron.Duvall@state.sd.us>
Sent: Wednesday, February 24, 2021 8:33 AM
To: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Cc: Schlaak, Karen <Karen.Schlaak@state.sd.us>; Gronlund, Eric <Eric.Gronlund@state.sd.us>
Subject: FW: Application for new collector well

External email - use caution when clicking on links or attachments.

Mr. Graverson,

Thank you for the application. I have looked it over and have a couple of questions.

- Your application indicates you want to transfer diversion authority under Water Right Nos. 1347-3 and 4103-3. I believe 4103-3 is intended to be 4101-3 (link to file for No. 4101-3 – https://denr.sd.gov/wrimage/wrinfo/wr_div3/4101-3.pdf) Please confirm.
- According to the application, the intention is to transfer 3.927 cfs from No. 1347-3 and 1.0 cfs from No. 4101-3 with a total annual volume of 2,600 acre-feet. Presumably of the 2,600 acre-feet you intend 724 acre-feet to be attributed to No. 4101-3 with the remaining number of acre-feet (2,600 – 724 = 1,876 acre-feet) coming from

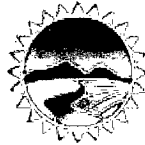
No. 1347-3. Assuming the transfer is approved, there will be 968 acre-feet (2,844 – 1,876) and 1.986 cfs (5.913 – 3.927) remaining on No. 1347-3. Please confirm you agree with the apportionment of the acre-feet figures as outlined here. Also, does the city have any plans for that remaining water in No. 1347-3?

The total fee is \$300.00 – \$100.00 application fee and a \$200.00 license fee payable to the SD DENR, Water Rights Program. After the fee is received, we can get busy processing your application which involves preparation of a report, the chief engineer's recommendation on the application, and preparing a public notice which will need to be advertised in Minnehaha and Lincoln counties.

If we have any further questions, we will let you know.

Thank you,

Ron Duvall
Water Rights Program
605.773.3352
denr.sd.gov



DENR
SOUTH DAKOTA

From: Graverson, Gavin <ggraverson@SIOUXFALLS.org>
Sent: Tuesday, February 23, 2021 7:54 AM
To: Gronlund, Eric <Eric.Gronlund@state.sd.us>
Subject: [EXT] Application for new collector well

Eric,

I have attached an application form for construction of a new collector well in the Big Sioux Aquifer. I have included technical memo from HRGreen and location maps. Can you review and see if I need anything else?

We would like to construct this well transferring existing water rights from Permit 1347-3 (3.927 CFS) & Permit 4103.-3 (1.0 CFS).

Gavin Graverson
Water Superintendent
Public Works



**CITY OF
SIOUX FALLS**

605-373-6940 605-940-0528 ggraverson@siouxfalls.org

www.siouxfalls.org

"Seeker of Visions."

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date March 5, 2021

RECEIVED OF City of Sioux Falls/Water Division c/o Gaven Graverson 2100 N Minnesota Ave Sioux Falls SD 57104

The following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>8497-3</u> to Appropriate Water, to construct and to put water to beneficial use	\$100.00
Fee for Application for Permit No. _____ to Appropriate Water for Future use	\$
Fee to retain Future Use Permit No. _____ after period of seven years.	\$
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>8497-3</u>	\$200.00
Fee for Filing Transfer Form _____	\$
Fee for _____	\$
Fee for Issuing New Well Driller's License No. _____	\$
Fee for Renewal of Well Driller's License No. _____	\$
Fee for Issuing Well Pump Installer's License No. _____	\$
Fee for Renewal of Well Pump Installer's License No. _____	\$
(Any Other Work Provided by Law) TOTAL	\$300.00

By

Eric Gronlund

Chief Engineer

vm

Schlaak, Karen

From: Schlaak, Karen
Sent: Monday, May 3, 2021 9:13 AM
To: ggraverson@siouxfalls.org
Subject: Water Permit Application No. 8497-3
Attachments: 8497-3.pdf

Attached is a copy of the report, chief engineer recommendation and information regarding the public notice for your water permit application. As stated in the letter, please contact the paper(s) as soon as possible to authorize publication and arrange for payment. This information is being mailed to you today.

Karen Schlaak
DANR - Water Rights Program
(605) 773-3352
Website: <https://danr.sd.gov>





**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 8497-3, City of Sioux Falls Water Division**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 8497-3, City of Sioux Falls Water Division, c/o Gavin M. Graverson, Water Superintendent, 2100 N Minnesota Ave., Sioux Falls SD 57104.

The Chief Engineer is recommending APPROVAL of Application No. 8497-3 because 1) the proposed diversion can be developed without unlawful impairment of existing rights, 2) the proposed use is a beneficial use and 3) it is in the public interest with the following qualifications:

1. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The well authorized by Permit No. 8497-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
2. The permit holder shall report to the Chief Engineer annually the amount of water withdrawn from the Big Sioux: Sioux Falls aquifer.
3. Water Permit No. 8497-3 authorizes a total annual diversion of 2,600 acre-feet of water.

See report on application for additional information.

Eric Gronlund

Eric Gronlund, Chief Engineer
April 30, 2021

Report to the Chief Engineer
On Water Permit Application No. 8497-3
To Amend Water Right Nos. 1347-3 and 4101-3
City of Sioux Falls c/o Gavin M Graverson

April 30, 2021

Water Permit Application No. 8497-3 requests to transfer a portion of the diversion rate authority authorized under Water Right Nos. 1347-3 and 4101-3, held by the City of Sioux Falls, to a new horizontal collector well. Water Right No. 1347-3 authorizes the appropriation of 2,844 acre-feet of water annually at a maximum instantaneous diversion rate of 5.913 cubic feet per second (cfs) from one well completed into the Big Sioux: Sioux Falls aquifer and located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 4-T101N-R49W for municipal use. Water Right No. 4101-3 authorizes a maximum instantaneous diversion rate of 1.0 cfs from one well completed into the Big Sioux: Sioux Falls aquifer and located in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 16-T102N-R49W for municipal use.

Water Permit Application No. 8497-3 proposes to transfer 3.927 cfs, and 1,876 acre-feet of water annually, from the diversion authority authorized by Water Right No. 1347-3 with a priority date of January 10, 1967. Additionally, Water Permit Application No. 8497-3 proposes to transfer the entire 1.0 cfs diversion rate, equating to 724 acre-feet of water annually, from the diversion authority authorized by Water Right No. 4101-3 with a priority date of April 8, 1957. If this application is approved, Water Permit Application No. 8497-3 would collectively authorize a total diversion authority of 4.927 cfs, and 2,600 acre-feet of water annually. Furthermore, if this application is approved, 1.896 cfs, and 968 acre-feet of water annually, would remain for Water Right No. 1347-3. The new collector well is to be completed into the Big Sioux: Sioux Falls aquifer and located in the SE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 9-T102N-R49W to serve municipal water users. The site of interest is located in Minnehaha County approximately one-half mile north of Renner, South Dakota.

AQUIFER: Big Sioux: Sioux Falls (BS: SF)

HYDROGEOLOGY:

The Big Sioux aquifer is an alluvium mantled, glacial outwash deposit that consists of silt, fine to coarse sand, and gravel (Koch, 1982). Most of the aquifer underlies the flood plain of the Big Sioux River (Lindgren and Niehus, 1992). In Minnehaha County, the Big Sioux aquifer has an average thickness of 22 feet and a documented maximum thickness of 71 feet (Lindgren and Niehus, 1992). The aquifer is thickest in the center of the Big Sioux River floodplain and thins out at the edges where the underlying glacial till confining unit is exposed at the ground surface (Davis et al., 2019). Hedges and others (1982) estimated the Sioux Falls management unit to underly 22,900 acres in Minnehaha County and contain approximately 103,050 acre-feet of recoverable water stored in the aquifer. The management unit of the aquifer is bounded to the north (near Dell Rapids) and on the south (near Sioux Falls) by the low permeability Sioux Quartzite (Davis et al., 2019). Figure 1 displays the areal extent of the Big Sioux: Sioux Falls

aquifer delineated by Hedges and others (1982). The Big Sioux: Sioux Falls aquifer is generally under unconfined conditions, and the direction of groundwater movement in the aquifer is south towards the Big Sioux River, which the aquifer is in hydraulic connection with (Davis et al., 2019; Lindgren and Niehus, 1992).

No water well or test hole completion report was submitted with Water Permit Application No. 8497-3. A technical memorandum, completed by HR Green, Inc and LRE Water, describing the horizontal collector well was submitted with Water Permit Application No. 8497-3. The memo indicated the water permit application will be for withdrawals associated with Well #72, a horizontal collector well to be completed in the SE corner of the Renner Well Field property. The City of Sioux Falls existing collector wells were estimated to yield 850 gallons per minute (GPM) based on modeled or calculated yields after 100 or 120 days of pumping. The applicant indicated the well is planned to be approximately 37 feet deep and the depth to water is approximately 7 feet below the ground surface.

South Dakota Codified Law (SDCL) 46-2A-12 and 46-5-30.4

Pursuant to SDCL 46-2A-12, "An amendment of an existing permit or license may be granted for a change in use, a change in point of diversion or other change only if the change does not unlawfully impair existing rights and is for a beneficial use and in the public interest." Also, pursuant to SDCL 46-5-30.4, "... Permits or rights may be amended pursuant to the procedure contained in chapter 46-2A. Priority shall be retained upon amendment. An amendment of a water permit or right may not increase the rate of diversion or increase the volume of water to be appropriated under the original water permit or right. The amendment may not impair existing rights."

An amendment of a water right/permit does not require consideration of water availability because no additional water is to be appropriated. If approved, Water Permit Application No. 8497-3 will amend Water Right Nos. 1347-3 and 4101-3 by transferring diversion authority for use under this application. These existing water rights have been withdrawing water from the Big Sioux: Sioux Falls aquifer for some time. This report will address the potential for unlawful impairment of existing water rights within the Big Sioux: Sioux Falls aquifer. However, for analysis and completeness purposes, observation well data and the average annual recharge and average annual withdrawal rates to and from the Big Sioux: Sioux Falls aquifer will be included in this report but a showing that water is available is not necessary since no additional water is being appropriated.

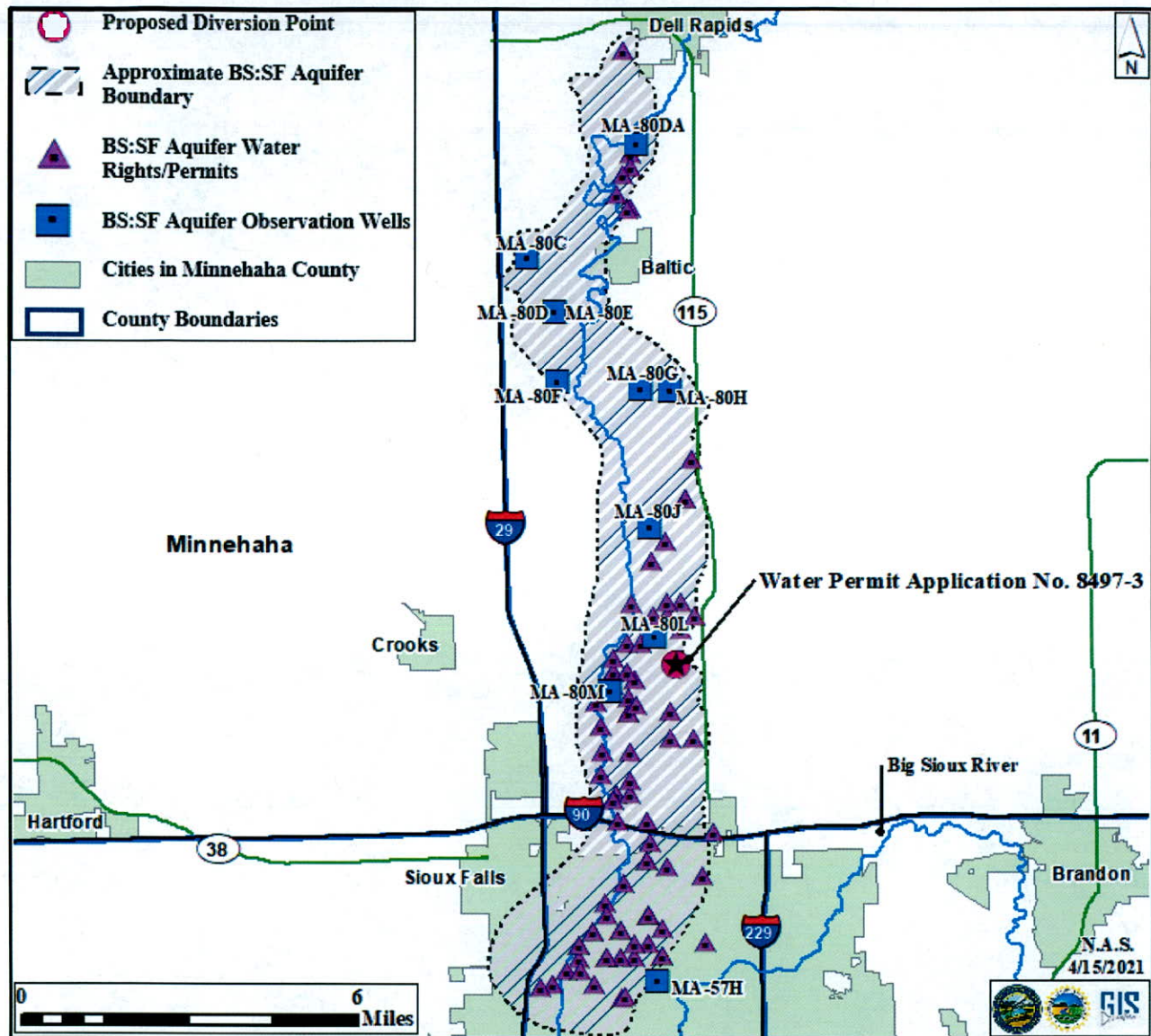


Figure 1. Map of the approximate Big Sioux: Sioux Falls aquifer delineated by Hedges and others (1982), the proposed diversion point for Water Permit Application No. 8497-3, and the Big Sioux: Sioux Falls aquifer water rights/permits and observation wells (Water Rights, 2021b and 2021c)

OBSERVATION WELL DATA:

Administrative Rule of South Dakota (ARSD) 74:02:05:07 requires that the Water Management Board shall rely upon the record of observation well measurements in addition to other data to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated average annual recharge of the aquifer.

The DANR-Water Rights Program monitors eleven observation wells completed into the Big Sioux: Sioux Falls aquifer (Water Rights, 2021b). These observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. MA-80L is the closest observation well to the proposed diversion point and is located approximately 0.6 miles northwest of the proposed well site (as shown in Figure 1). The hydrographs for the Big Sioux: Sioux Falls observation wells are displayed in Figure 2 (Water Rights, 2021b). The observation well hydrographs were constructed with data points that are measurements of the static water level in the observation wells adjusted to be the elevation from the ground surface instead the measured depth below top of well casing in Figure 2. It is worth noting, the observation well hydrographs do not reflect the use of the volume of water currently reserved by Big Sioux: Sioux Falls aquifer future use permits.

The hydrographs for the Big Sioux: Sioux Falls aquifer indicate that the aquifer responds well to climatic conditions because water levels are rising during wetter periods (early spring snowmelt and precipitation) and declining to a stable water level during drier periods. Additionally, the water levels in the observation wells display that the amount of recharge to and natural discharge from the aquifer greatly exceeds pumping with the aquifer returning to pre-pumping conditions between irrigation seasons. Aquifer recovery indicates that climatic conditions and therefore, the effects of recharge to and natural discharges from the aquifer govern the long-term fluctuations in water levels of the aquifer rather than the impacts of pumping from the Big Sioux: Sioux Falls aquifer. By recognizing that both recharge to and natural discharge from an aquifer can be captured for pumping, the observation well hydrographs demonstrate unappropriated water is available in the Big Sioux: Sioux Falls aquifer.

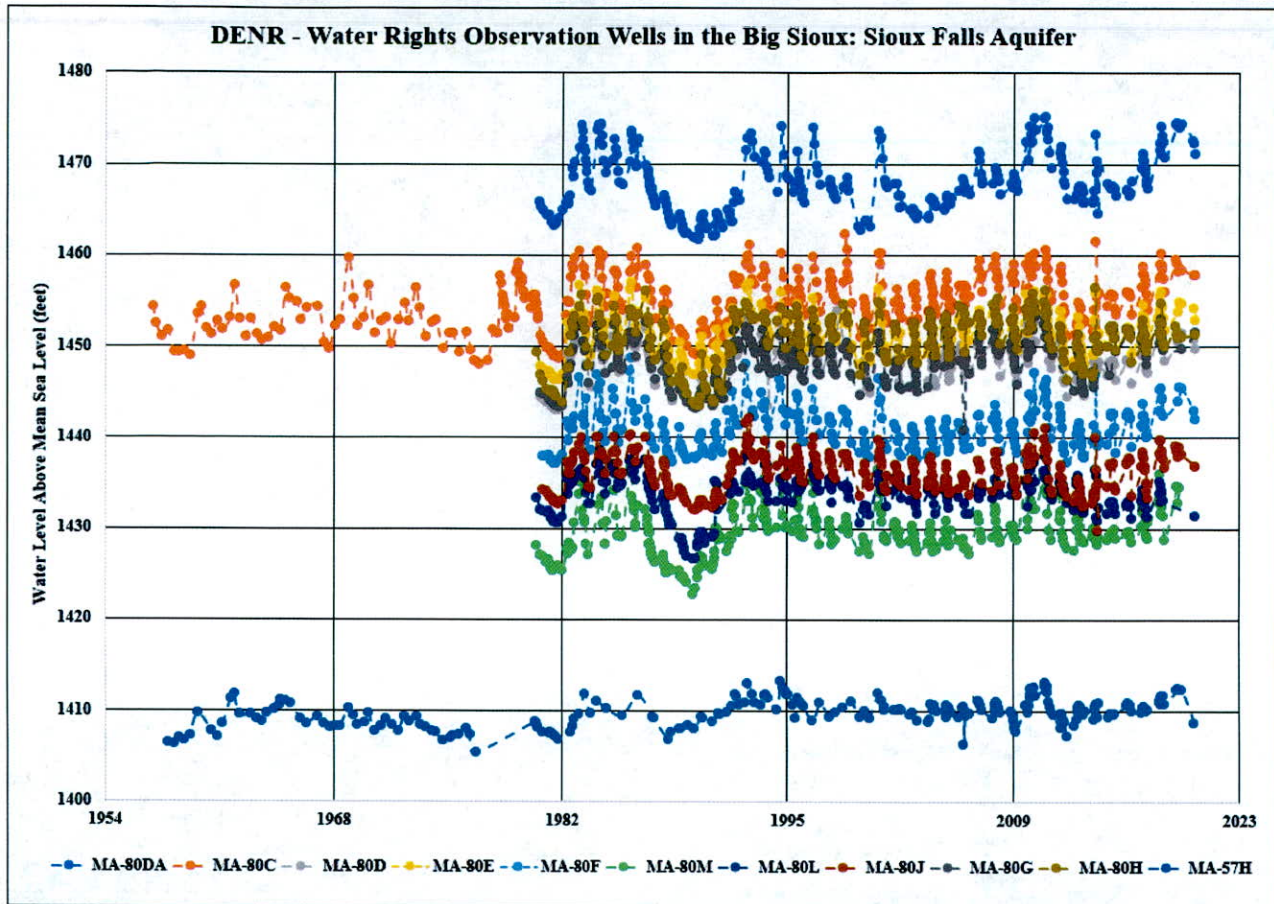


Figure 2. Hydrographs for observation wells MA-80DA (ground surface elevation: 1,475 ft), MA-80C (ground surface elevation: 1,463 ft), MA-80D (ground surface elevation: 1,460 ft), MA-80E (ground surface elevation: 1,460 ft), MA-80F (ground surface elevation: 1,451 ft), MA-80M (ground surface elevation: 1,436 ft), MA-80L (ground surface elevation: 1,440 ft), MA-80J (ground surface elevation: 1,444 ft), MA-80G (ground surface elevation: 1,453 ft), MA-80H (ground surface elevation: 1,457 ft), and MA-57H (ground surface elevation: 1,419 ft) (SDGS, 2021; Water Rights, 2021b)

HYDROLOGIC BUDGET:

Recharge

Recharge to the Big Sioux: Sioux Falls aquifer occurs primarily through the infiltration of precipitation in the flood plain of the Big Sioux River and seepage from the Big Sioux River when the river stage is higher than the potentiometric surface in the aquifer (Davis et al., 2019; Lindgren and Niehus, 1992). Table 1 displays average annual recharge rates to the Big Sioux: Sioux Falls aquifer estimated by Hedges and others (1985) and Koch (1982) using different methods of analysis.

Table 1. Average annual recharge rates estimated for the Big Sioux: Sioux Falls aquifer

	Method of Analysis	Recharge Rate (inches/year)	Recharge Rate (acre-feet/year)
Hedges et. al, 1985	Base Flow Recession	6.5	12,412
Hedges et. al, 1985	Observation Well	5.6	10,694
Hedges et. al, 1985	Regional Flow Net	1.0*	1,908
Koch, 1982	Computer Model	6.9	13,176
*minimum estimate			

Discharge

Discharge from the Big Sioux: Sioux Falls aquifer occurs primarily through evapotranspiration, to the Big Sioux River when the river stage is lower than the potentiometric surface in the aquifer, possible leakage to underlying aquifers, and well withdrawals (Davis et al., 2019; Lindgren and Niehus, 1992). Collectively, there are 65 water rights/permits and temporary use permits out of future use authorized to appropriate water from the Big Sioux: Sioux Falls aquifer (Water Rights, 2021c). Additionally, there are five future use permits reserving 8,675 acre-feet of water from the Big Sioux: Sioux Falls aquifer (Table 2) (Water Rights, 2021c).

Table 2. Future use permits reserving water from the Big Sioux: Sioux Falls aquifer (Water Rights, 2021c)

Permit No.	Name	Reserved Volume (acre-feet)
448-3	City of Sioux Falls	3,842
4838-3	Minnehaha Community Water Corp	0
4838A-3	Minnehaha Community Water Corp	33
5523-3	City of Sioux Falls	4,050
5716-3	Minnehaha Community Water Corp	750
	Total:	8,675

As development of the Sioux Falls management unit of the Big Sioux aquifer has increased over time, a majority of the appropriations have been made by the City of Sioux Falls (Water Rights, 2021c). Although there are several other rights/permits appropriating water from the Sioux Falls management unit, historically the average annual use has been less than the maximum volume that is authorized to be pumped (Water Rights, 2021c and 2021f). The withdrawals that are annually reported from the Big Sioux: Sioux Falls aquifer by appropriative users (the City of Sioux Falls, Minnehaha Community Water Corporation, and irrigation) are shown in Table 3 (Buhler, 2012; Water Rights, 2021a and 2021f).

Table 3. Water use reported from the Big Sioux: Sioux Falls aquifer (Buhler, 2012; Water Rights, 2021a and 2021f)

Year	Sioux Falls (acre-feet/year)	Minnehaha Community Water Corporation (acre-feet/year)	Lincoln County RWS (acre-feet/year)	Irrigation (acre-feet/year)
1990	17,788	1,253		473
1991	10,257	1,400		409
1992	12,334	1,458		160
1993	9,956	1,489		124
1994	10,597	1,722		253
1995	8,211	1,753		240
1996	10,586	1,966		246
1997	12,383	1,842		467
1998	11,647	1,967		294
1999	11,507	2,098		414
2000	9,014	2,219	n/a	494
2001	12,873	2,314	n/a	359
2002	6,788	2,405	n/a	459
2003	11,402	2,630	695	440
2004	12,284	2,636	858	421
2005	16,712	2,661	881	473
2006	17,540	2,888	876	374
2007	14,992	2,722	935	341
2008	13,113	2,725	64	331
2009	16,713	2,552	402	232
2010	18,401	2,468	450	144
2011	22,279	2,662	457	330
2012	15,935	2,839	333	663
2013	14,018.60	2,338	7	537
2014	11,745	2,262	0	492
2015	8,612	2,252	0	466
2016	4,423	2,370	0	429
2017	4,471	2,412	0	444
2018	4,822	2,366	0	157
2019	3,195	2,026	0	111
Min	22,279	2,888	935	663
Max	3,195	1,253	0	111
Avg	11,820	2,223	350	359

Table 4 summarizes the seven non-irrigation water rights/permits that are authorized to appropriate water from the Big Sioux: Sioux Falls aquifer but are not required to report their annual withdrawals and were not included in Table 3. Table 4 includes the estimated annual use for each water right/permit as determined by their limiting diversion rate or annual volume. The amount of water that can be withdrawn was estimated by assuming the non-irrigation water rights/permits limited by an annual volume will withdraw their entire appropriated volume every year. It is estimated that the non-irrigation water rights/permits limited only by a diversion rate will pump at their maximum permitted diversion rate for 60 percent of the time. The average annual withdrawal rate by the non-irrigation water rights/permits is estimated to be 686.4 acre-feet per year (Table 4).

Table 4. Non-irrigation water rights/permits that are authorized to appropriate water from the Big Sioux: Sioux Falls aquifer that are not required to report and were not included in Table 3 (Water Rights, 2021c)

Permit No.	Name	Status	Type	Diversion Rate (cfs)	Estimated Use (acre-feet/year)
4620-3	Climate Systems Inc	LC	GEO/IRR	0.4	173.8
4843-3	KOA Campgrounds of Sioux Falls	LC	COM/DOM	0.15	65.2
4880-3	Henry Carlson	LC	GEO	0.06	26.1
5019-3	Midwest Lawn Care Corp	LC	COM	0.23	99.9
5681-3	St. Michael Cemetery	LC	COM	0.06	26.1
7174-3	The Truck Washout	LC	COM	0.5	217.2
7247-3	Sioux Falls Regional Airport	PE	IRR/COM	0.18	78.2
				Total:	686.4
LC: Licensed Water Right, PE: Water Permit; GEO: Geothermal; IRR: Irrigation; COM: Commercial; DOM: Domestic					

On average, the appropriative users that are required to report their annual withdrawal rate from the Big Sioux: Sioux Falls aquifer withdraw approximately 14,752 acre-feet per year (Buhler, 2012; Water Rights, 2021a and 2021f). The non-irrigation water rights/permits that are not required to report their annual withdrawal rate are estimated to withdraw approximately 686.4 acre-feet per year (Water Rights, 2021c). Collectively, the average annual withdrawal rate from the Big Sioux: Sioux Falls aquifer is approximately 15,438.4 acre-feet per year.

There are domestic wells completed into the Big Sioux: Sioux Falls aquifer that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2021d). Due to their relatively low diversion rates, withdrawals from domestic wells are not considered to be a significant portion of the hydrologic budget. Additionally, with the development of rural water systems in areas where the Big Sioux: Sioux Falls aquifer is the uppermost aquifer available; it is likely some domestic users may have transitioned to rural water. Therefore, the quantity of water withdrawn by domestic wells is estimated to be negligible to the hydrologic budget for the Big Sioux: Sioux Falls aquifer.

Hydrologic Budget Summary

The average annual recharge rates to the Big Sioux: Sioux Falls aquifer estimated by Hedges and others (1985) and Koch (1982) ranged from 1,908 to 13,176 acre-feet per year. The average annual withdrawal rate from the Big Sioux: Sioux Falls aquifer is approximately 15,438.4 acre-feet per year. Based off the higher recharge rate value, the average quantity of water withdrawn from the aquifer annually exceeds the estimated recharge by 2,262.4 acre-feet. That exceedance would amount to a 2.2 percent decrease of the estimated recoverable water stored in the Big Sioux: Sioux Falls aquifer. That large of a reduction of water in storage would be noticeable on the hydrographs as declining water levels. The hydrographs do not show a sustained downward trend in water level nor do the hydrographs support the average annual recharge rate estimates.

1991 Declaratory Ruling

On November 14, 1991, through a declaratory ruling, the Water Management Board established a limitation on the annual withdrawals due to pumping by water right/permit holders from the Sioux Falls management unit of the Big Sioux aquifer to 32,200 acre-feet annually, excluding the withdrawals from individual domestic wells that do not require a water permit (Water Rights, 1992b). The declaratory ruling was requested due to complaints regarding a decline of water levels in private domestic wells completed into the Big Sioux: Sioux Falls aquifer near the Renner Township in South Dakota, which is north of Sioux Falls (Water Rights, 1992b). From investigation, the domestic well problems were determined to be the result of an overall lowering in the water levels of the aquifer which could have been partially due to drought conditions at that time as water levels in aquifers fluctuate (Water Rights, 1992b). Additionally, the impacted wells were located in the eastern marginal area of the aquifer where there was no saturated aquifer thickness at that time (Water Rights, 1992b). Lastly, the domestic well problems could have been due to the installation of a wastewater collection system preventing some recharge to the aquifer in the immediate area (Water Rights, 1992b). The basis for the limitation amount of 32,200 acre-feet per year is that it is the maximum amount of water that can be pumped from the Sioux Falls management unit that causes no net change in storage in the aquifer (Water Rights, 1992a). When the annual volume limitation on withdrawals is approached, water use will be restricted on a priority basis until withdrawals do not exceed 32,200 acre-feet per year. The practical effect of the limit allows for management of the aquifer on a priority basis if necessary. At the current level of development, it is not likely that withdrawals from appropriative users will equate to 32,200 acre-feet per year. However, development of the 8,675 acre-feet per year that has been reserved for future use could cause annual pumping to reach the established annual volume limitation (Table 2). If the volume limitation of 32,200 acre-feet per year is approached, water use would be restricted on a priority basis, so withdrawals do not exceed the annual volume limitation.

Temporary Use Permits

On June 28, 1957, the Water Rights Commission (now known as the Water Management Board) approved Future Use Permit No. 448-3. Permit No. 448-3 reserves 46.8 cfs from the Big Sioux: Sioux Falls aquifer for future use to be utilized by the City of Sioux Falls (Water Rights, 2021c). Currently, 3,842 acre-feet per year remains reserved by this permit from the future use area shown in Figure 3. Fifteen previous applications have been filed to appropriate water from within the future use area specified by Permit No. 448-3 (Table 5).

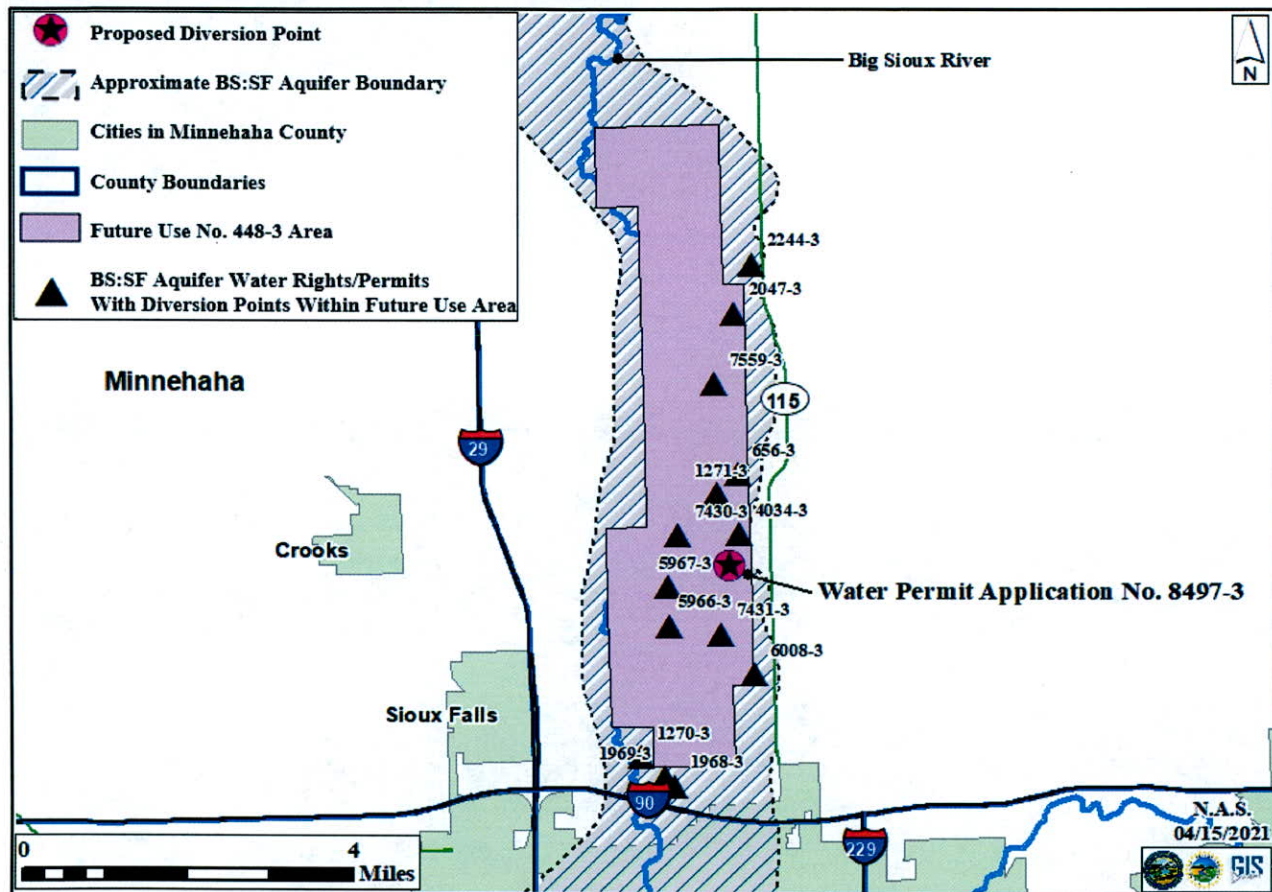


Figure 3. Map of the Big Sioux: Sioux Falls aquifer with the future use area as defined by Future Use Permit No. 448-3 and the water permit applications with diversion points within the future use area (Water Rights, 2021c)

Table 5. Water Permit Applications with diversion points within the future use area as defined by Future Use Permit No. 448-3, as shown in Figure 3 (Water Rights, 2021c)

Permit No.	Name	Status	Priority Date
656-3	Goeden Properties LLC	LC	08/28/1959
1270-3	RC Sweetman	LC	02/23/1966
1271-3	EM Sweetman	IL	02/23/1966
1790-3	Lincoln County RWS	IL	11/23/1970
1968-3	Gene Williams	WI	
1969-3	Gene Williams	WI	
4034-3	EM Sweetman	OC	05/13/1977
4034A-3	KB Investments LLC	LC	02/23/1966
5966-3	Michael G Williams	PE	11/06/1996
5967-3	Michael G Williams	PE	11/06/1996
6008-3	Herman Brende	PE	06/06/1997
7430-3	Michael G Williams	PE	09/10/2012
7431-3	Michael G Williams	PE	09/10/2012
7559-3	Wademan Peterson	PE	12/13/2012
LC: Licensed Water Right, PE: Water Permit; IL: Incorporated License;			
WI: Withdrawn; OC: Owner Change			

Water rights displayed in Table 5 with priority dates on or before May 13, 1977, were approved with the following qualification (except Water Permit No. 1790-3):

“The City of Sioux Falls has priority rights to the water under future use withdrawal permits, and this application is approved subject to these prior rights if or when the city develops the reserve water supplies.”

Water Permit Nos. 5966-3, 5967-3, 6008-3, 7430-3, 7431-3 and 7559-3 were approved as temporary use permits pursuant to SDCL 46-5-39. SDCL 46-5-39 allows the Water Management Board to authorize a temporary appropriation of water from the unused portion of a future use permit. However, SDCL 46-5-40 states that the temporary use permits would be effective only until such time as the future use holder wants to use the water covered by the temporary use permit. The holder of the temporary use permit would then be given six months of notice and the permit would be cancelled at the end of the six-month period.

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

Collectively, there are 65 water rights/permits and temporary use permits out of future use authorized to appropriate water from the Big Sioux: Sioux Falls aquifer, plus five future use permits reserving water (Water Rights, 2021c). The closest water right/permit to proposed diversion point is Water Permit No. 7430-3, which is held by Michael G Williams. The diversion point for Water Permit No. 7430-3 is located approximately 0.72 miles northwest of the proposed diversion point for this application (Figure 4) (Table 6) (Water Rights, 2021c).

There are domestic wells on file with the DANR-Water Rights Program that are completed into the Big Sioux: Sioux Falls aquifer, with the closest domestic well on file (not held by the applicant) approximately 0.3 miles southwest of the proposed diversion point (Water Rights, 2021d). There are potentially other domestic wells completed into the Big Sioux: Sioux Falls aquifer near the proposed diversion point that are not on file with the DANR-Water Rights Program.

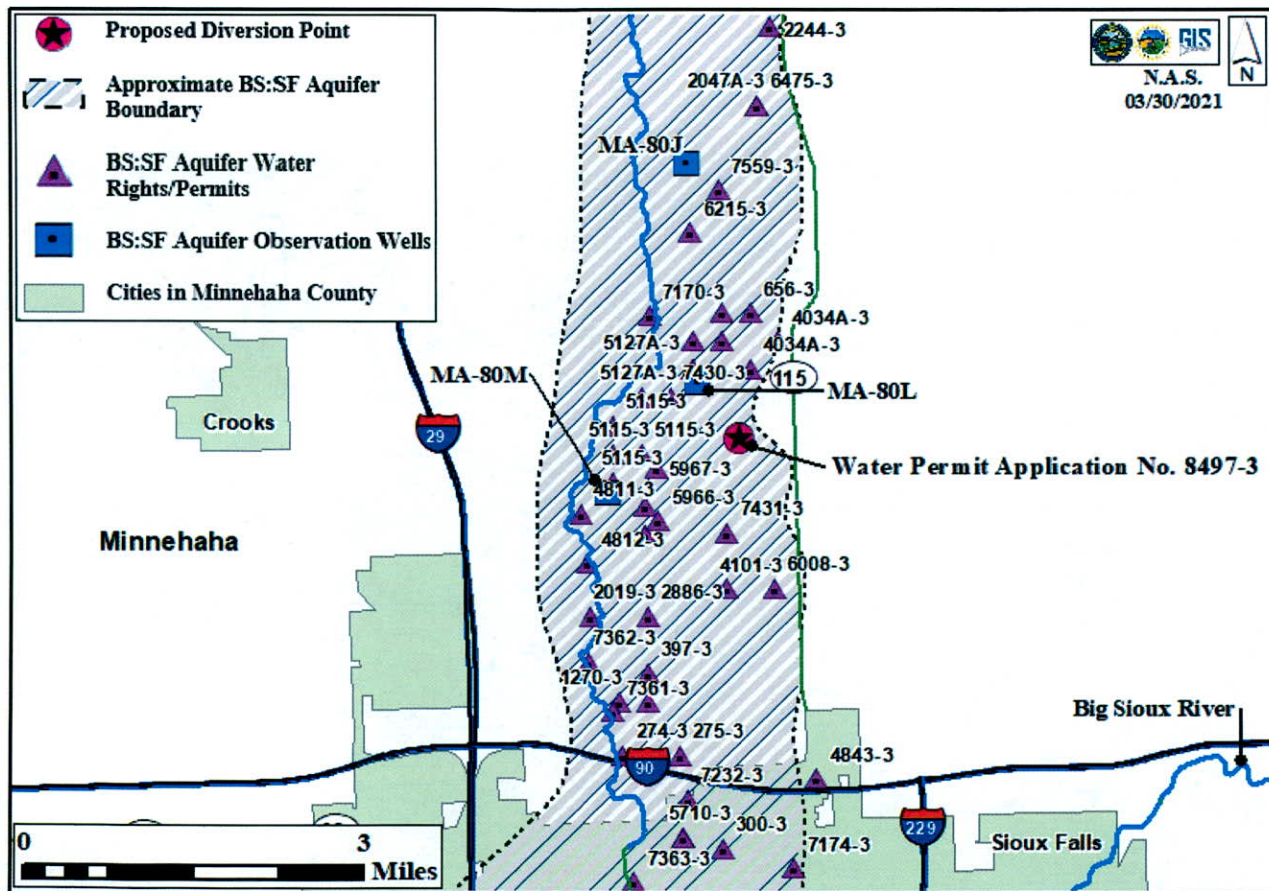


Figure 4. Location of the proposed diversion point for Water Permit Application No. 8497-3 with the Big Sioux: Sioux Falls aquifer water rights/permits and observation wells within approximately three miles (Water Rights, 2021b and 2021c)

Table 6. Water rights/permits authorized to withdraw water from the Big Sioux: Sioux Falls aquifer within approximately three miles of the proposed diversion point, as shown in Figure 4 (Water Rights, 2021c)

Permit No.	Name	Status	Use	Diversion Rate (cfs)	Annual Volume (acre-feet)
274-3	City of Sioux Falls	LC	MUN	2	
275-3	City of Sioux Falls	LC	MUN	1.78	
300-3	City of Sioux Falls	LC	MUN	3.21	
397-3	City of Sioux Falls	LC	MUN	3.12	
656-3	Goeden Properties I LLC	LC	IRR	1.14	
1270-3	RC Sweetman	LC	IRR	1.66	
2018-3	City of Sioux Falls	LC	MUN	3.1	
2019-3	City of Sioux Falls	LC	MUN	3.1	
2047A-3	City of Sioux Falls	PE	MUN	1.44	
2244-3	City of Sioux Falls	LC	IRR	1.33	
2747-3	City of Sioux Falls	LC	MUN	3.1	
2886-3	City of Sioux Falls	LC	MUN	3.1	
4034A-3	KB Investments LLC	LC	IRR	2.43	
4098-3	City of Sioux Falls	LC	MUN	1	
4099-3	City of Sioux Falls	LC	MUN	1	
4100-3	City of Sioux Falls	LC	MUN	1	
4101-3	City of Sioux Falls	LC	MUN	1	
4811-3	City of Sioux Falls	LC	MUN	2.67	
4812-3	City of Sioux Falls	LC	MUN	4.01	
4843-3	KOA Kampgrounds of Sioux Falls	LC	COM/DOM	0.15	
5115-3	City of Sioux Falls	LC	MUN	5	1,140
5127A-3	City of Sioux Falls	LC	MUN	5.5	1,600
5710-3	City of Sioux Falls	LC	MUN	4.12	2,501
5966-3	Michael G Williams	PE	IRR	1.56	
5967-3	Michael G Williams	PE	IRR	1.5	
6008-3	Herman Brende	PE	IRR	1	
6215-3	City of Sioux Falls	LC	MUN	2.22	1,193
6475-3	City of Sioux Falls	LC	MUN	3.2	1,475
7170-3	City of Sioux Falls	LC	MUN	4.33	2,988
7174-3	The Truck Washout	LC	COM	0.5	60
7232-3	City of Sioux Falls	LC	MUN	4.476	3,247
7361-3	City of Sioux Falls	LC	MUN	4.57	2,978
7362-3	City of Sioux Falls	LC	MUN	4.57	2,978
7363-3	City of Sioux Falls	LC	MUN	4.57	2,978
7430-3	Michael G Williams	PE	IRR	1.11	
7431-3	Michael G Williams	PE	IRR	1.11	
7559-3	Wademan Peterson	PE	IRR	3.33	

LC: Licensed Water Right, PE: Water Permit; MUN: Municipal; IRR: Irrigation; COM: Commercial; DOM: Domestic

In Minnehaha County, the Big Sioux: Sioux Falls aquifer is generally under unconfined conditions with some variation in depth to the top of the aquifer and saturated aquifer thickness (Lindgren and Niehus, 1992; SDGS, 2021; Water Rights, 2021b, 2021c and 2021d). The Big Sioux: Sioux Falls aquifer is expected to be unconfined near the proposed diversion point based on the well completion reports for nearby water rights/permits and lithologic logs on file for nearby observation wells (SDGS, 2021; Water Rights, 2021b, 2021c and 2021d). Drawdown created by pumping a well generally does not extend far from the pumped well in an unconfined aquifer; however, the exact drawdown behavior of a well cannot be known without an aquifer performance test.

Near the proposed diversion point, the Big Sioux: Sioux Falls aquifer is expected have a saturated aquifer thickness ranging from approximately 30 to 40 feet and a static water level ranging from approximately 5 to 10 feet below the ground surface (SDGS, 2021; Water Rights, 2021d). This would allow for enough thickness for a pump to be placed 20 feet below the top of the aquifer, which is required for the well to be considered adequate under ARSD 74:02:04:20(6). Any drawdown as a result of the proposed diversion is not expected to unlawfully impair nearby adequate wells. In Minnehaha County, there has been one complaint filed with the DNR-Water Rights Program regarding well interference in a Sioux Quartzite well between the City of Sioux Falls and a neighboring trailer court (Water Rights, 2021e). After investigation, there was no information that indicated development of the City of Sioux Falls wells adversely impacted the neighboring trailer court's Sioux Quartzite well. The proposed diversion point for this application is approximately 2.5 miles north of the neighboring trailer court's Sioux Quartzite well (Water Rights, 2021c). Additionally, there have been no complaints on file with the DNR-Water Rights Program regarding well interference for adequate wells completed into the Big Sioux: Sioux Falls aquifer following the declaratory ruling (Water Rights, 2021e).

When considering the saturated aquifer thickness of the Big Sioux: Sioux Falls aquifer near the proposed diversion point, and the lack of well interference complaints for adequate wells completed into the Big Sioux: Sioux Falls aquifer in Minnehaha County, any drawdown created from the proposed diversion is not expected to cause an unlawful impairment on existing water right/permit holders or domestic users with adequate wells. Therefore, there is a reasonable probability that any interference from the proposed diversion will not impose unlawful impairments on existing users with adequate wells.

Well Interference:

There are a number of wells authorized by Big Sioux: Sioux Falls aquifer water rights/permits near the well site proposed by Water Permit Application No. 8497-3. The closest water right/permit to proposed diversion point is Water Permit No. 7430-3, which is held by Michael G Williams. The diversion point for Water Permit No. 7430-3 is located approximately 0.72 miles, or approximately 3,800 feet, northwest of the proposed diversion point for this application. Well interference may occur, however since the Big Sioux: Sioux Falls aquifer is under unconfined conditions, the cone of depression cause by pumping is not expected to extend very far from the pumped well. The actual effect of withdrawals will cause only a few feet of drawdown in any of

the other wells. Any interference caused by this appropriation is not expected to cause unlawful impairment due to the distance between the proposed diversion point and neighboring wells.

CONCLUSIONS:

1. Water Permit Application No. 8497-3 requests to transfer a portion of the diversion authority authorized under Water Right Nos. 1347-3 and 4101-3, held by the City of Sioux Falls, to a new collector well. Water Right No. 1347-3 authorizes the appropriation of 2,844 acre-feet of water annually at a diversion rate of 5.913 cfs from one well completed into the Big Sioux: Sioux Falls aquifer for municipal use. Water Right No. 4101-3 authorizes a diversion rate of 1.0 cfs from one well completed into the Big Sioux: Sioux Falls aquifer for municipal use.
2. Water Permit Application No. 8497-3 proposes to transfer 3.927 cfs and 1,876 acre-feet of water annually from the diversion authority authorized by Water Right No. 1347-3 with a priority date of January 10, 1967, and the entire 1.0 cfs (724 acre-feet) of water annually authorized by Water Right No. 4101-3 with a priority date of April 8, 1957. If approved, Water Permit Application No. 8497-3 would collectively authorize a total diversion authority of 4.927 cfs (2,600 acre-feet) of water annually.
3. The new collector well is to be completed into the Big Sioux: Sioux Falls aquifer and located in the SE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 9-T102N-R49W. The site of interest is located in Minnehaha County approximately one-half mile north of Renner, South Dakota to serve municipal water uses.
4. The Big Sioux: Sioux Falls aquifer is heavily appropriated.
5. The SD DANR – Water Rights Program observation wells do not currently show that average annual withdrawals exceed average annual recharge. It is worth noting, the observation well hydrographs do not reflect the use of the volume of water currently reserved by Big Sioux: Sioux Falls aquifer future use permits.
6. On November 14, 1991, through a declaratory ruling, the Water Management Board established a limitation on the amount of water pumped from the Big Sioux: Sioux Falls aquifer to 32,200 acre-feet per year and if that limit is reached, water use will be restricted on a priority date basis.
7. At the current level of development, fully developing the future use reservations would likely cause average annual withdrawals to approach or exceed the 32,200 acre-feet per year limit.
8. Based on the November 14, 1991 Water Management Board declaratory ruling, there is not a reasonable probability that unappropriated water is available for this proposed appropriation. However, this application proposes to transfer diversion rate and annual

volume authority from existing water rights to a new well at a new location within the Big Sioux: Sioux Falls aquifer so no increase in total appropriation from the aquifer would occur as a result of approval of this application.

9. There is a reasonable probability that the proposed diversion by Water Permit Application No. 8497-3 will not unlawfully impair adequate wells for existing water right/permit holders and domestic users.

Nakaila Steen

Nakaila Steen
Natural Resources Engineer I
SD DANR – Water Rights Program

Reviewed by:

Adam Mathiowetz
Adam Mathiowetz, PE
Natural Resources Engineer III
SD DANR -Water Rights Program

References

- Barari, A., Iles, D., and Cowman, T., 1989. Assessment of Water Resources and Conceptual Evaluation of Regional Water Supply for Southeastern South Dakota, SD Dept of Environment and Natural Resources, Geological Survey Program, Open-File Report, 60-UR, 18 p.
- Buhler, K.A., 2012. Report on Water Permit Application Nos. 7430-3 and 7431-3 - Michael G Williams. SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Davis, K.W., Eldridge, W.G., Valder, J.F., and Valseth, K.J., 2019. Groundwater-Flow Model and Analysis of Groundwater and Surface-Water Interactions for the Big Sioux Aquifer, Sioux Falls, South Dakota: U.S. Geological Survey Scientific Investigations Report 2019-5117. 86 p., Reston, Virginia.
- Hedges, L.S., Burch, S.L., Iles, D.L., Barari, R.A., Schoon, R.A., 1982. Evaluation of Ground- Water Resources Eastern South Dakota and Upper Big Sioux River, South Dakota and Iowa, Task I: Bedrock Topography and Distribution, Task 2: Extent of Aquifers, Task 3: Ground-Water Storage, Task 4: Computerized Data Base, Final Report; U.S. Army Corps of Engineers Contract DACW 45-80-C-0185.
- Koch, N.C., 1982. A Digital-Computer Model of the Big Sioux Aquifer in Minnehaha County, South Dakota. Water-Resources Investigations Report 82-4064. U.S. Geological Survey. Huron, SD.
- Lindgren, R.J. and Niehus, C.A., 1992. Water Resources of Minnehaha County, South Dakota. Water-Resources Investigations Report 91-4101. U.S. Geological Survey. Huron, SD.

- SDGS, 2021. South Dakota Geological Survey Lithologic Logs Database. Accessed April 12, 2021. <http://cf.sddenr.net/lithdb/>.
- Water Rights, 1992a. "October 2, 1991 Water Management Board Minutes." SD DANR Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 1992b. "November 14, 1991 Water Management Board Minutes." SD DANR Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 2021a. "1979-2019 Irrigation Summaries by Aquifer", SD DANR-Water Rights Program, Joe Foss Building, Pierre, SD.
- Water Rights, 2021b. Observation Well Data, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 2021c. Water Right/Permit Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 2021d. Well Completion Reports, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 2021e. County Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 2021f. "1994-2019 Non-Irrigation Yearly Reports", SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

Argus Leader

P.O. Box 677349, Dallas, TX 75267-7349

Account No.: SFA-0000000586

Ad No.: 0004718950

PO #: 8497-3

Lines : 127

Ad Total: \$81.93

This is not an invoice

of Affidavits 1

CITY OF SIOUX FALLS - SUPT WAT
2100 N MINNESOTA AVE
SIOUX FALLS, SD 57104

Account No.: SFA-0000000586

Ad No.: 0004718950

Argus Leader AFFIDAVIT OF PUBLICATION

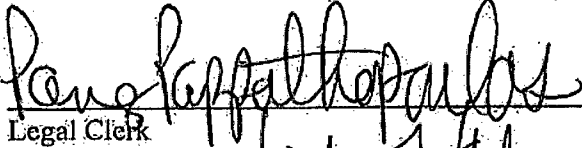
STATE OF SOUTH DAKOTA

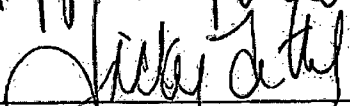
COUNTY OF MINNEHAHA

I being duly sworn, says: That The Argus Leader is, and during all the times hereinafter mentioned was, a daily legal newspaper as defined by SDCL 17-2-21, as amended published at Sioux Falls, Minnehaha County, South Dakota; that affiant is and during all of said times, was an employee of the publisher of such newspaper and has personal knowledge of the facts stated in this affidavit; that the notice, order or advertisement, a printed copy of which is hereto attached, was published in said newspaper upon

Thursday, May 13, 2021

Sworn to and subscribed before me this 13 day of May, 2021.


Legal Clerk


Notary Public, State of Wisconsin, County of Brown

979.7
My Commission expires

VICKY FELTY
Notary Public
State of Wisconsin

NOTICE OF
APPLICATION NO. 8497-3
to Amend Water Right Nos.
1347-3 and 4101-3

Notice is given that the City of Sioux Falls Water Division, c/o Gavin M. Graverson, Water Supt, 2100 N. Minnesota Ave, Sioux Falls SD 57104 has filed an application to transfer water appropriated under existing Water Right Nos. 1347-1 and 4101-3 held by the City of Sioux Falls to a new collector well. Water Right No. 1347-3 authorizes use of 2,844 acre-feet of water annually at a maximum pump rate of 5.913 cubic feet of water per second (cfs) from one well completed into the Big Sioux: Sioux Falls aquifer located in the SW 1/4 SW 1/4 Section 4-T101N-R49W for municipal use. Water Right No. 4101-3 authorizes a maximum pump rate of 1.0 cfs from one well completed into the Big Sioux: Sioux Falls aquifer located in the SE 1/4 SW 1/4 Section 16-T102N-R49W for municipal use. This application proposes to transfer the 1.00 cfs diversion rate, equaling to 724 acre-feet of water annually, authorized by No. 4101-3 and 3.927 cfs and 1,876 acre-feet annually authorized by No. 1347-3 for a total diversion authority transfer of 4.927 cfs and 2,600 acre-feet annually. The proposed site for the new collector well is located in the SE 1/4 NW 1/4 Section 9-T102N-R49W approximately one half mile north of Renner SD and will be completed into the Big Sioux: Sioux Falls aquifer to serve municipal water uses.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8497-3 with qualifications because 1) existing rights will not be unlawfully impaired, 2) It is a beneficial use of water, and 3) It is in the public interest. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.sd.gov/public> or contact Ron Duvall for this information, or other information, of the Water Rights Program address provided below.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given

above. A petition filed by either an interested person or the applicant must be filed by May 24, 2021.

The petition may be informal but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board.

If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application.

Notice of the hearing will be given to the applicant and any person filing a petition.

Published once at the total approximate cost of \$81.93.

44718950 May 13, 2021

Affidavit of Publication

STATE OF SOUTH DAKOTA
COUNTY OF LINCOLN

TERESA ZOMER

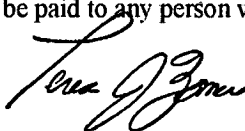
being first duly sworn on his oath says; that the Sioux Valley News is a legal weekly newspaper of general circulation as required by South Dakota Code of Nineteen Hundred Thirty-Nine, and any acts amendatory thereto, printed and published by the Sioux Valley News, Inc., in Canton, in said county and State, and has been such legal newspaper during the time hereinafter mentioned; that he is and during all of said time was publisher of said newspaper and has personal knowledge of the facts stated in this affidavit; that the advertisement headed:

DANR
Notice of Application

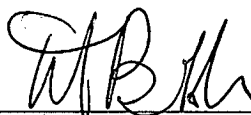
a printed copy of which is hereto attached, was printed and published in said newspaper for **ONE** successive week(s) upon the following dates, to-wit:

May 13, 2021

that the full amount of the fees charged for publishing the same to-wit: the sum of **\$34.04** inures solely to the benefit of the publishers of said newspaper; that no agreement or understanding for any division of this sum has been made with any other person; and that no part of said sum has been agreed to be paid to any person whomsoever.

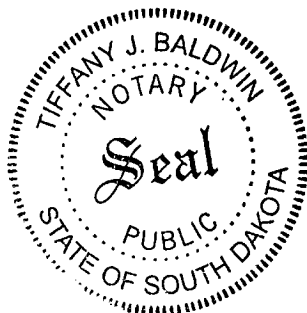


Ascribed and sworn to before me this 13th day of May, 2021



Notary Public, South Dakota

(Seal)



My Commission Expires
January 12, 2024

**NOTICE OF APPLICATION NO.
8497-3 to Amend Water Right Nos.
1347-3 and 4101-3**

Notice is given that the City of Sioux Falls Water Division, c/o Gavin M Graverson, Water Supt, 2100 N Minnesota Ave, Sioux Falls SD 57104 has filed an application to transfer water appropriated under existing Water Right Nos. 1347-1 and 4101-3 held by the City of Sioux Falls to a new collector well. Water Right No. 1347-3 authorizes use of 2,844 acre-feet of water annually at a maximum pump rate of 5.913 cubic feet of water per second (cfs) from one well completed into the Big Sioux: Sioux Falls aquifer located in the SW 1/4 SW 1/4 Section 4-T101N-R49W for municipal use. Water Right No. 4101-3 authorizes a maximum pump rate of 1.0 cfs from one well completed into the Big Sioux: Sioux Falls aquifer located in the SE 1/4 SW 1/4 Section 16-T102N-R49W for municipal use. This application proposes to transfer the 1.00 cfs diversion rate, equating to 724 acre-feet of water annually, authorized by No. 4101-3 and 3.927 cfs and 1,876 acre-feet annually authorized by No. 1347-3 for a total diversion authority transfer of 4.927 cfs and 2,600 acre-feet annually. The proposed site for the new collector well is located in the SE 1/4 NW 1/4 Section 9-T102N-R49W approximately one half mile north of Renner SD and will be completed into the Big Sioux: Sioux Falls aquifer to serve municipal water uses.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8497-3 with qualifications because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

RECEIVED

MAY 17 2021

**WATER RIGHTS
PROGRAM**

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by May 24, 2021.

The petition may be informal but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Published in the Sioux Valley News on May 13, 2021 at the total approximate cost of \$34.04.



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

**NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPERS RIGHT AWAY.**

May 3, 2021

City of Sioux Falls Water Division
c/o Gavin M Graverson, Water Supt
2100 N Minnesota Ave
Sioux Falls SD 57104

Dear Mr. Graverson:

Water Permit Application No. 8497-3 for municipal use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Argus Leader printed at Sioux Falls SD (Ph # 605 764-2000) and the Sioux Valley News printed at Canton SD (Ph # 605 331-2200). You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization from you, the publishers have been instructed to publish your notice. The newspapers have also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Karen Schlaak

Karen Schlaak
Water Rights Program
(605) 773-3352

enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.

NOTICE OF APPLICATION NO. 8497-3
to Amend Water Right Nos. 1347-3 and 4101-3

Notice is given that the City of Sioux Falls Water Division, c/o Gavin M Graverson, Water Supt, 2100 N Minnesota Ave, Sioux Falls SD 57104 has filed an application to transfer water appropriated under existing Water Right Nos. 1347-1 and 4101-3 held by the City of Sioux Falls to a new collector well. Water Right No. 1347-3 authorizes use of 2,844 acre-feet of water annually at a maximum pump rate of 5.913 cubic feet of water per second (cfs) from one well completed into the Big Sioux: Sioux Falls aquifer located in the SW 1/4 SW 1/4 Section 4-T101N-R49W for municipal use. Water Right No. 4101-3 authorizes a maximum pump rate of 1.0 cfs from one well completed into the Big Sioux: Sioux Falls aquifer located in the SE 1/4 SW 1/4 Section 16-T102N-R49W for municipal use. This application proposes to transfer the 1.00 cfs diversion rate, equating to 724 acre-feet of water annually, authorized by No. 4101-3 and 3.927 cfs and 1,876 acre-feet annually authorized by No. 1347-3 for a total diversion authority transfer of 4.927 cfs and 2,600 acre-feet annually. The proposed site for the new collector well is located in the SE 1/4 NW 1/4 Section 9-T102N-R49W approximately one half mile north of Renner SD and will be completed into the Big Sioux: Sioux Falls aquifer to serve municipal water uses.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8497-3 with qualifications because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by May 24, 2021.

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Published once at the total approximate cost of_

Schlaak, Karen

From: Schlaak, Karen
Sent: Monday, May 3, 2021 8:31 AM
To: 'svn@siouxvalleynewsonline.com'
Subject: FW: 8497-3, City of Sioux Falls
Attachments: 8497-3public.short.docx; FORM8.FRM.doc

Make that date of publication May 13, 2021.
Thanks.

From: Schlaak, Karen
Sent: Monday, May 3, 2021 8:27 AM
To: svn@siouxvalleynewsonline.com
Subject: 8497-3, City of Sioux Falls

Attached is a notice to be published on April 13, 2021.

City of Sioux Falls Water Division, c/o Gavin Graverson, Water Supt, 2100 N Minnesota Ave, Sioux Falls SD 57104 (605 373-6940) has been notified to contact you to authorize publication and arrange for payment.

Please send the affidavit or return the attached Proof of Publication form ASAP to the Water Rights Program, 523 E Capitol, Pierre SD 57501.

Let me know if you have questions. Please acknowledge receipt of this email.

Karen Schlaak
DANR - Water Rights Program
(605) 773-3352
Website: <https://danr.sd.gov>



Schlaak, Karen

From: Schlaak, Karen
Sent: Monday, May 3, 2021 8:30 AM
To: Argus Legals (arguslegals@argusleader.com)
Subject: FW: 8497-3, City of Sioux Falls
Attachments: 8497-3public.short.docx; FORM8.FRM.doc

Make that date of publication May 13, 2021.

Thanks

From: Schlaak, Karen
Sent: Monday, May 3, 2021 8:27 AM
To: 'legals@argusleader.com' <legals@argusleader.com>
Subject: 8497-3, City of Sioux Falls

Attached is a notice to be published on April 13, 2021.

City of Sioux Falls Water Division, c/o Gavin Graverson, Water Supt, 2100 N Minnesota Ave, Sioux Falls SD 57104 (605 373-6940) has been notified to contact you to authorize publication and arrange for payment.

Please send the affidavit or return the attached Proof of Publication form ASAP to the Water Rights Program, 523 E Capitol, Pierre SD 57501.

Let me know if you have questions. Please acknowledge receipt of this email.

Karen Schlaak
DANR - Water Rights Program
(605) 773-3352
Website: <https://danr.sd.gov>





**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

JUL 06 2021

City of Sioux Falls Water Division
Gavin M Graverson, Water Supt
2100 N Minnesota Ave
Sioux Falls SD 57104

Dear Mr. Graverson:

Enclosed is Water Permit No. 8497-3 authorizing construction of the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

An informational sheet *Common Water Right Questions?* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

Eric Gronlund
Eric Gronlund, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

8497-3

RECEIVED

AUG 17 2022

OFFICE OF
WATER

Form 10

NOTICE OF COMPLETION OF WORKS AND
APPLICATION OF WATER TO BENEFICIAL USE

Date August 12th, 2022

TO: Water Rights Program, DANR
523 E. Capitol
Pierre, SD 57501-3181

FROM: Ted Lewis, City of Sioux Falls Water Division, Engineer
(name)

2100 N Minnesota Ave
(address)

Sioux Falls, SD 57104
(city, state, zip)

605-373-6946
(phone)

I have completed the construction of the water use system and I have put the water to beneficial use to the maximum extent it is going to be used.

Water Permit No. 8497-3 states that the water use system is to be constructed by
May 24th, 2026 , and water is to be put to beneficial use by May 24th, 2030 .
(date) (date)

The water use system was completed on July 7th, 2022 .
(date)

Applying the water to beneficial use was completed on August 4th, 2022 .
(date)

You may schedule an investigation so that the water license may be issued.


(signature)





**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

August 17, 2022

8497-3

Ted Lewis
City of Sioux Falls Water Division
2100 N Minnesota Ave
Sioux Falls SD 57104

Dear Mr. Lewis:

I am writing to acknowledge receipt of the "Notice of Completion of Works" form that you sent in to let us know that the works are completed for Water Permit No. 8497-3.

The system is now ready for inspection. Inspections are done on a county-by-county basis as staff time permits. You have done everything you need to do and the intervening time between the completion of your project and the staff inspection has no bearing on your water permit.

Someone from our office will contact you prior to the inspection to set up a time that is convenient for you. If you have any questions, please contact me.

Sincerely,

Genny McMath
Water Rights Program
(605) 773-3352
email: genny.mcmath@state.sd.us

8497-3 | 1347-3
4101-3

Report of Examination of Works and/or Application of Water to Beneficial Use For Permit No. 8497-3

I have this day, July 19, 2023, made a thorough examination of the water use system constructed by City of Sioux Falls Water Division, 2100 N Minnesota Ave, Sioux Falls, SD 57104 of Permit No. 8497-3, authorizing the transfer of water authorized under 1347-3 & 4104-3 from Big Sioux : Sioux Falls Aquifer for Municipal purposes, in Minnehaha County.

A. Works used to divert the water:

Well Information: Please see attached well completion report and supporting documents.

- 1) Well Drilling Firm: Ranney Collector Wells
- 2) No. of Wells 1
- 3) Depth(s) _____ feet
- 4) Well log is available Y

B. Compliance with Permit Requirements:

- 1) Permit qualifications being abided by Y

If no, describe:

- 2) Exceptions to compliance are:
- 3)

C. Condition and Location:

1. The system is in good condition with the point(s) of diversion located as follows: WELL LOCATION From the NE corner Sec 9 T102N R49W 2425 ft S & 2492 ft W, Lat 43.65306 Long -96.72194 (SE ¼ NW ¼)
2. The works are capable of diverting and conveying to the place of use 4.927 cu. ft. per second of water and the license should be issued for 4.927 cfs and/or 2600 acre-feet annually.
3. All structures, wells and lands on map Y

D. Comments or other permit(s) associated with the project:

This is a unique permit in that it involves a change in diversion point for Lies 1347-3 and 4101-3. I have been in communication with Mr. Matt Pajl (mpajl@hrgreen.com, 605/221-2669) of the H R Green Company, the engineering company responsible for the project.



Darrell W DeBoer
Water Rights Inspector
DANR, Water Rights Program

Date report completed: 12/08/2023



0 0.1 0.2 0.4 0.6 0.8 Miles



Darrell DeBoer
Water Right Inspector
DANR-Water Rights Program



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

DEC 11 2023

8497-3

City of Sioux Falls Water Division
c/o Chris Myers
2100 N Minnesota Ave
Sioux Falls SD 57104

Dear Mr. Myers:

Enclosed is Water License No. 8497-3. This is the final water right document completing your process of obtaining a Water Right. Included with your license is a map prepared by the staff engineer who conducted the field investigation.

For your information SDCL 46-6-27 requires that if in the future, the owner of an existing well, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

So long as you use the water beneficially, as stated in the Water License, State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Sincerely,

Eric Gronlund, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

STATE OF SOUTH DAKOTA
WATER LICENSE NO. 8497-3

(1) City of Sioux Falls Water Division; 2100 N Minnesota Ave, Sioux Falls SD 57104, made Application No. 8497-3, February 23, 2021, for a water transfer water appropriated under Water Right Nos. 1347-3 & 4101-3 to a new collector well. Water Right Nos. 1347-3 & 4101-3 authorize a combined total of 4.927 cubic feet of water per second and 2,600 acre-feet annually from groundwater, two wells (Big Sioux: Sioux Falls Aquifer), Minnehaha County, South Dakota for municipal purposes. Permit No. 8497-3 was approved May 24, 2021, and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before May 24, 2026, and for the application to beneficial use of water on or before May 24, 2030.

The applicant submitted a "Notice of Completion of Works" form on August 12, 2022, indicating that construction had been completed July 7, 2022, and water had been put to beneficial use August 4, 2022.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 4.927 cubic feet of water per second and 2,600 acre-feet of water for beneficial use. The location of the diversion point is:

- 2,492 ft W & 2,425 ft S of the NE corner Section 9, T102N, R49W (SE ¼ NW ¼)
(Latitude 43.65306 & Longitude -96.72194)

(3) The water appropriated may not exceed the amount of water needed for beneficial use. The water is to be used during the following described annual period: January 1 – December 31.

(4) The permit holder has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use.

(5) Pursuant to South Dakota Water Law 46-5-30.1 City of Sioux Falls Water Division, the holder and/or owner of Water Right No. 8497-3 is issued a license to appropriate water, the right to use 4.927 cubic feet of water per second and 2,600 acre-feet annually from groundwater, one well (Big Sioux: Sioux Falls Aquifer), with priority dates of April 8, 1957 for 1.0 cfs & 724 acre-feet (under Water Right No. 4101-3) and January 10, 1967 for 3.927 cfs & 1,876 acre-feet (under Water Right No. 1347-3), from the location specified in (2) of this license for municipal purposes.

This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Right No. 8497-3 and subject to the following qualifications:

1. The well approved under this Water Right will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Water Right shall control their withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

continued

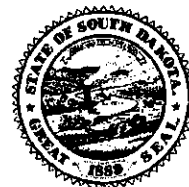
2. The well authorized under this Water Right No. 8497-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with the Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28. *(The well was completed in 2022 by Ranney Collector Wells. A copy of the well completion report is on file with the Water Rights Program.)*
3. The Water Right holder shall report to the Chief Engineer annually the amount of water withdrawn from the Big Sioux: Sioux Falls Aquifer.
4. Water Right No. 8497-3 authorizes a total annual diversion of 2,600 acre-feet of water.

Eric Gronlund

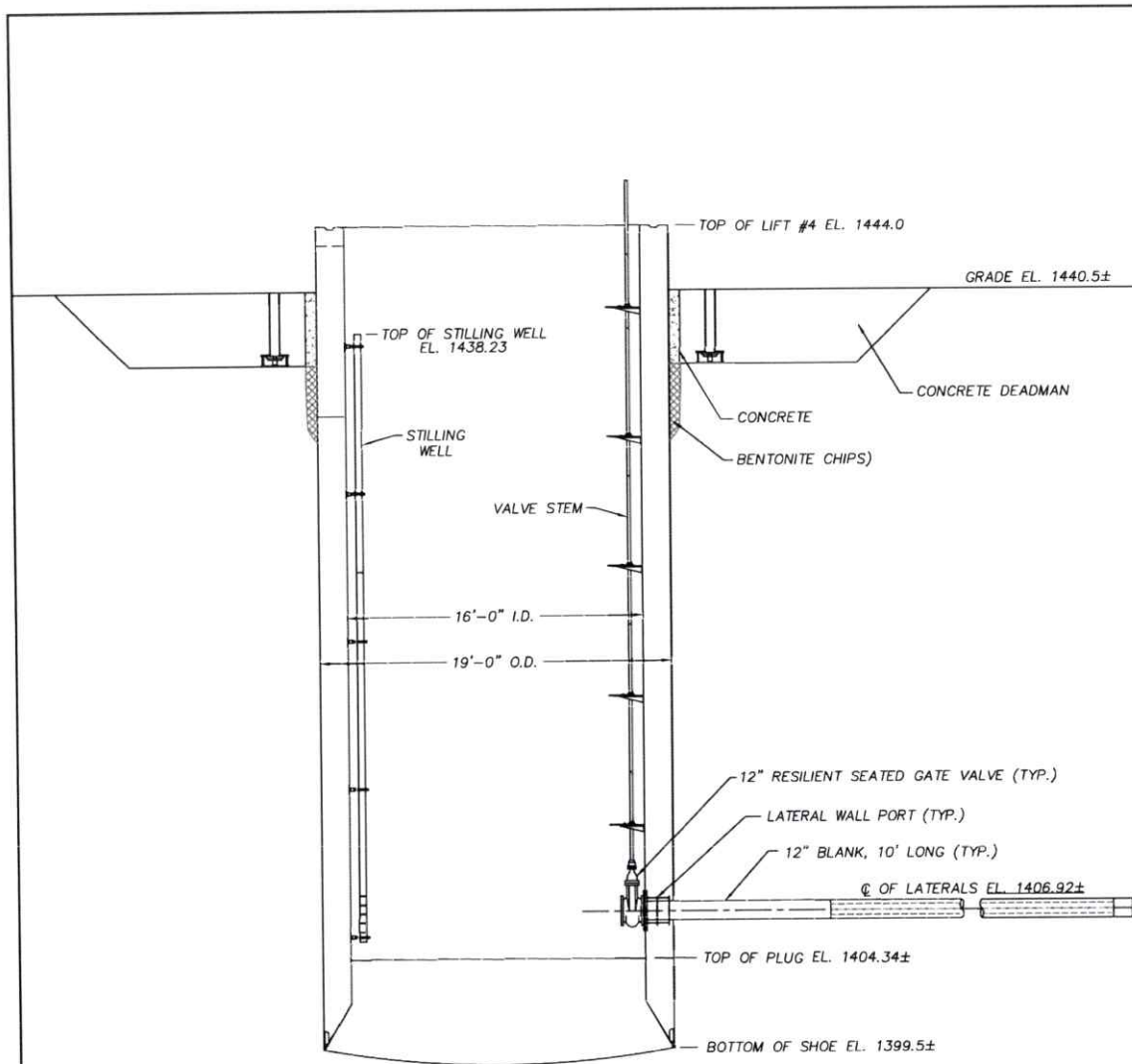
Eric Gronlund, Chief Engineer
Water Rights Program
Department of Agriculture and Natural Resources

DEC 11 2023

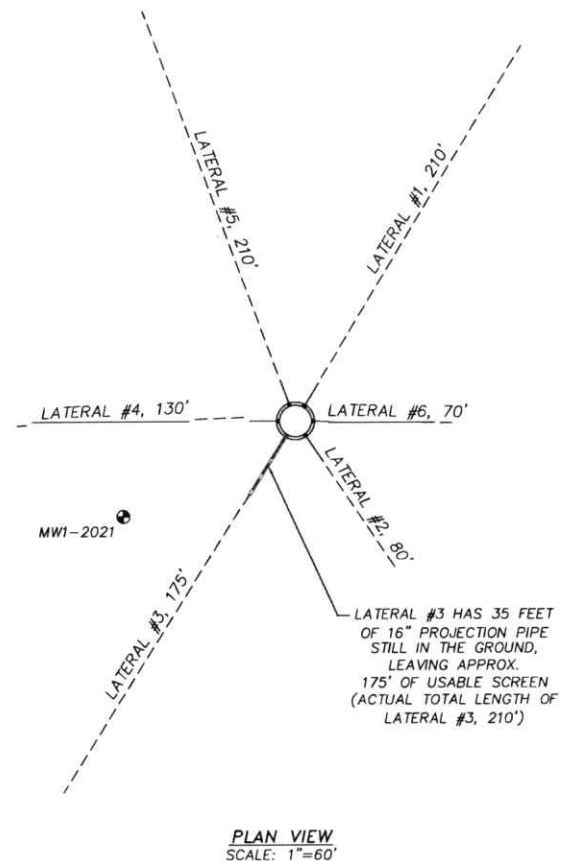
date



Date: 11-2-23



VERTICAL SECTION THRU CAISSON
SCALE: N.T.S.



LEGEND:

● OBSERVATION WELL

Layne
A GRANITE COMPANY
RANNEY COLLECTOR WELLS
6360 HUNTLEY ROAD
COLUMBUS, OHIO 43229
(614) 888-6263 / FAX (614) 888-9208

SECTION AND PLAN VIEW
COLLECTOR WELL 72
47427 257th ST
RENNER, SOUTH DAKOTA 57055

FILE NAME:
1130293-06
PROJECT #:
1130293

DATE:
4/27/22
SCALE:
AS NOTED

FIGURE
1

TABLE 1 (continued)
Collector Well 72 Well Design Summary
City of Sioux Falls, South Dakota

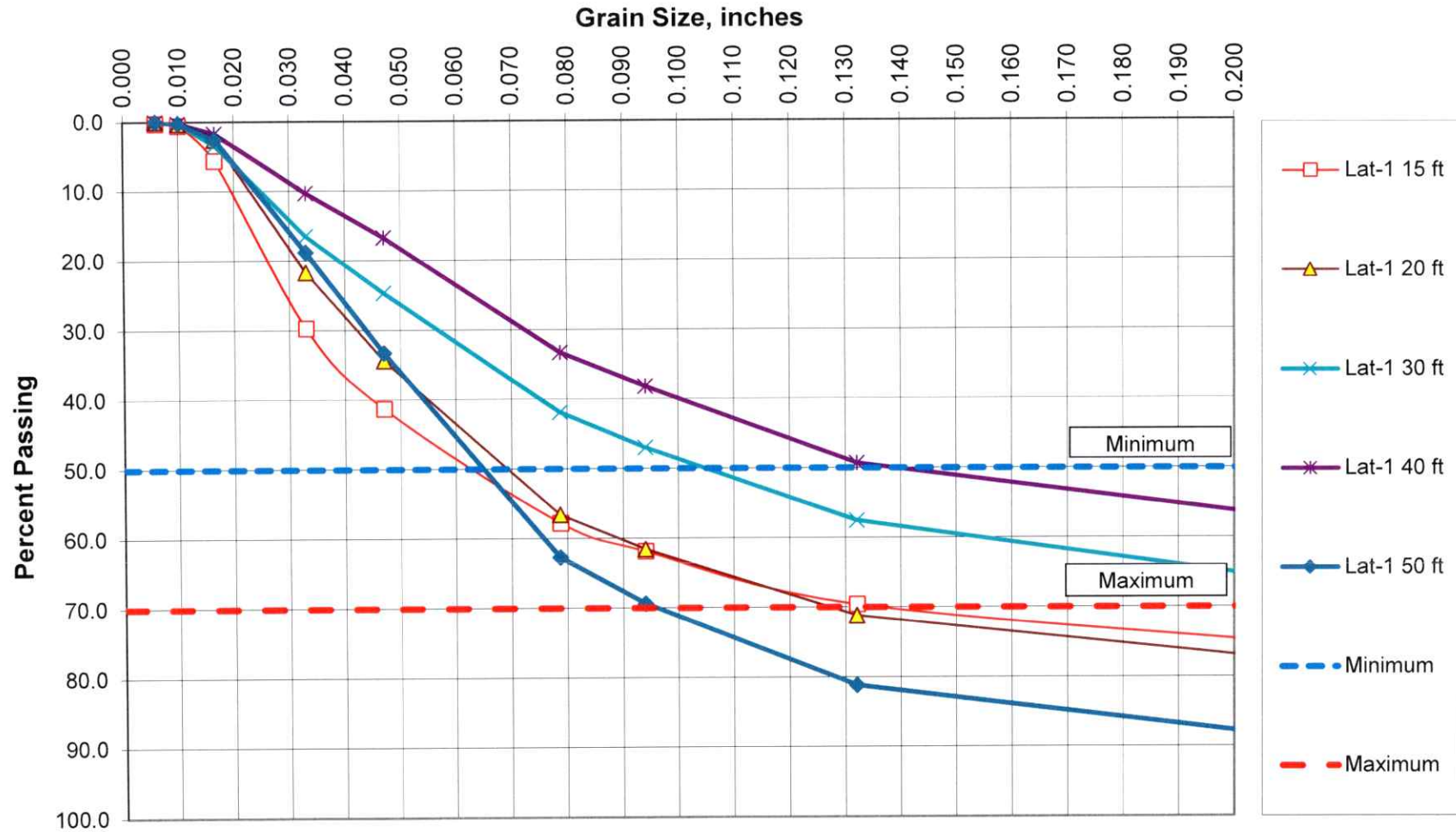
SCREEN MATERIAL: 12.75-inch OD, 12-inch ID, Type 130 Wire-Wound Stainless Steel (wire width 0.130-inch)

LATERAL SCREEN SLOT SIZE PLACEMENT (feet from inside caisson wall)

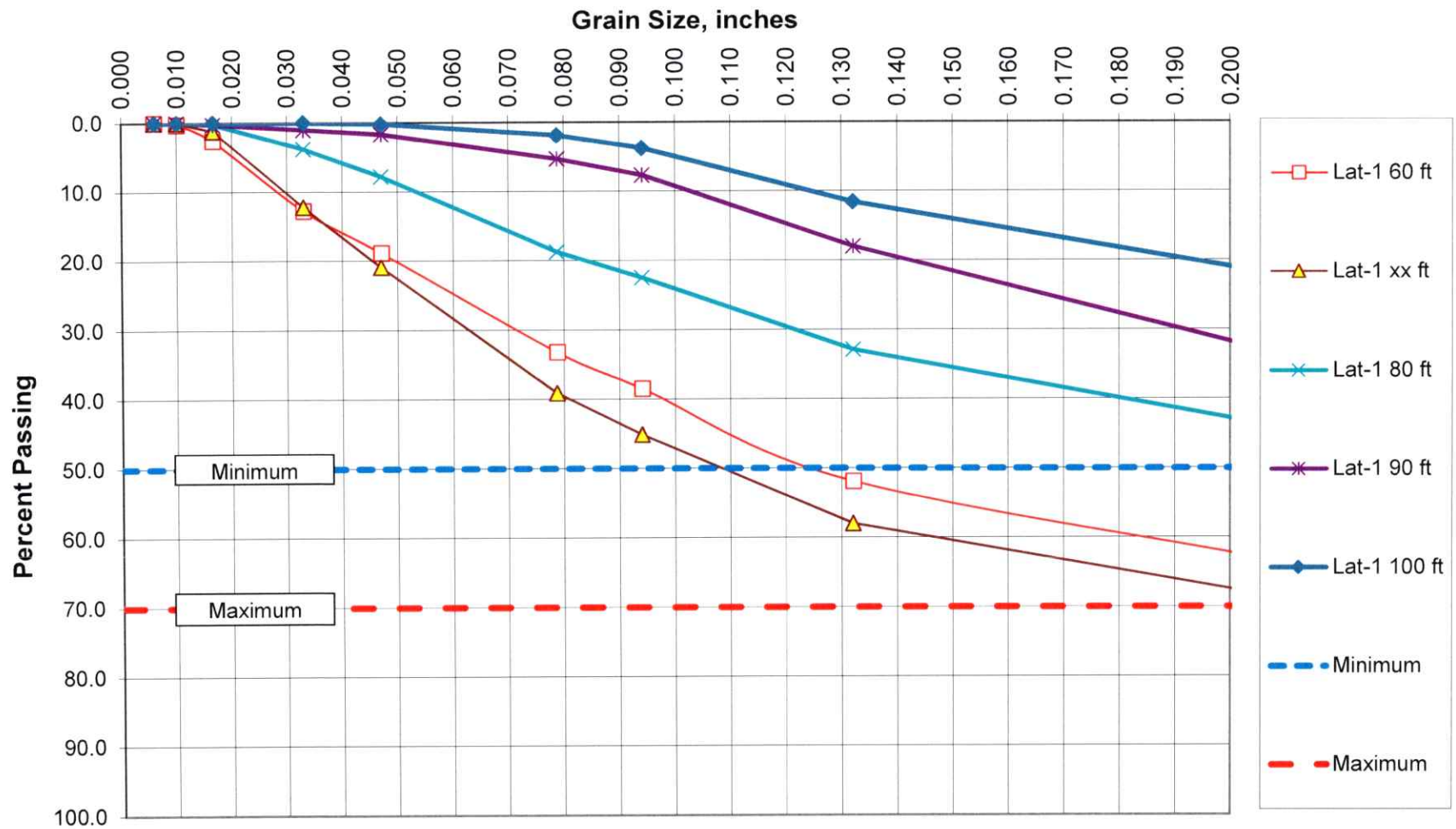
Lateral Number	SCREEN SLOT SIZE (inches)								
	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.125	0.150
1			180-190 190-200 200-210	50-60 170-180	10-20 20-30 40-50 60-70 160-170	30-40 70-80 130-140 140-150 150-160		80-90 120-130	90-100 100-110 110-120
2			70-80	50-60 60-70	10-20 20-30	30-40 40-50			
3	200-210		170-180 190-200	150-160 160-170 180-190	130-140 140-150	35-40 50-60 120-130		40-50 60-70 90-100 110-120	70-80 80-90 100-110
4			10-20 50-60	40-50 60-70 110-120 120-130	20-30 100-110	30-40 70-80 90-100		80-90	
5	160-170	110-120		30-40 40-50 70-80 100-110	20-30 50-60 60-70 90-100 120-130 150-160 170-180	10-20 80-90	130-140 140-150 180-190 190-200 200-210		
6				60-70	30-40 40-50	10-20 50-60		20-30	
Total Length	20	10	80	160	200	165	50	80	60

TOTAL SCREEN OPEN AREA (Adjusted for couplings and blank sections): 1,023 ft²

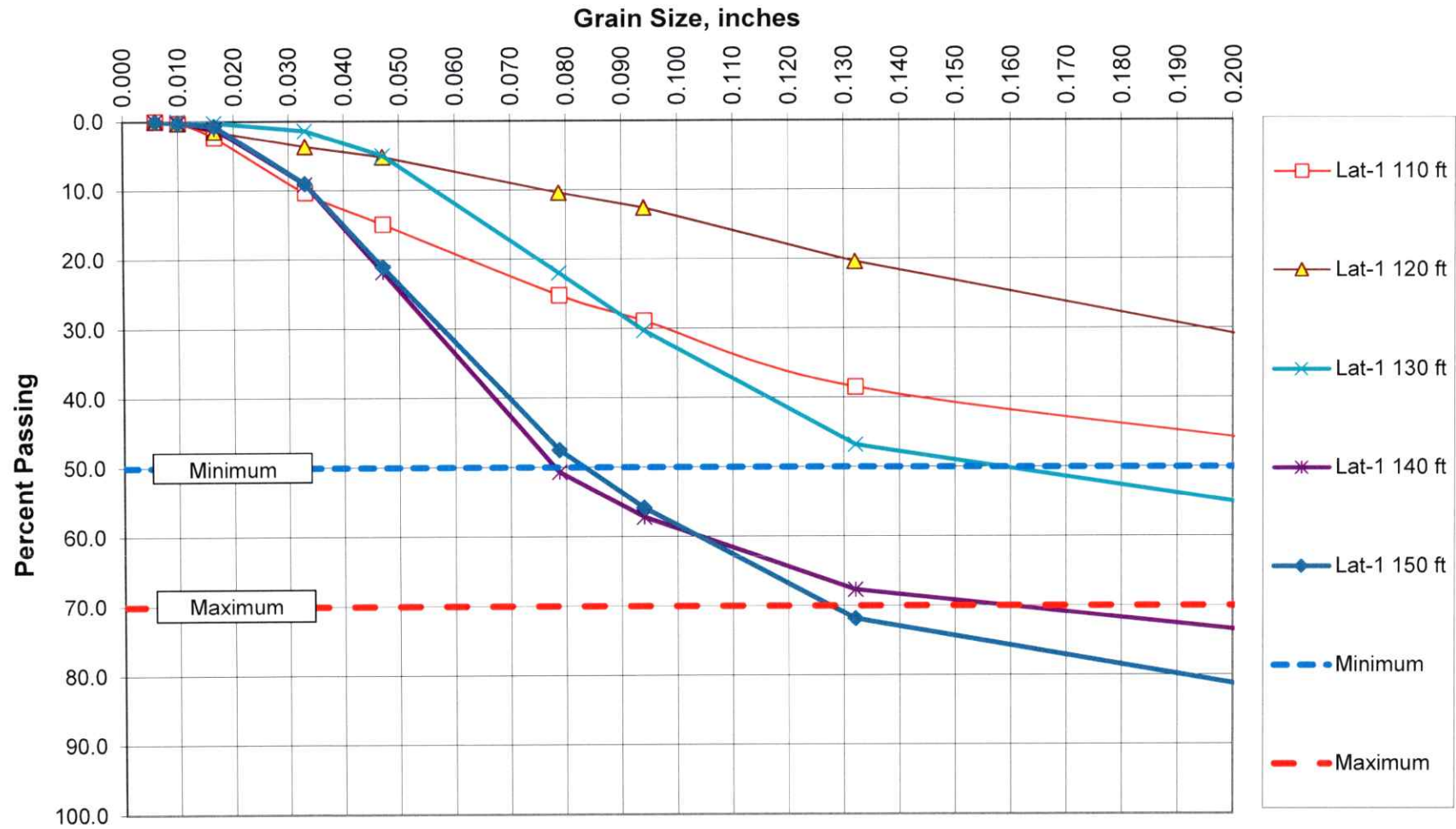
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1**



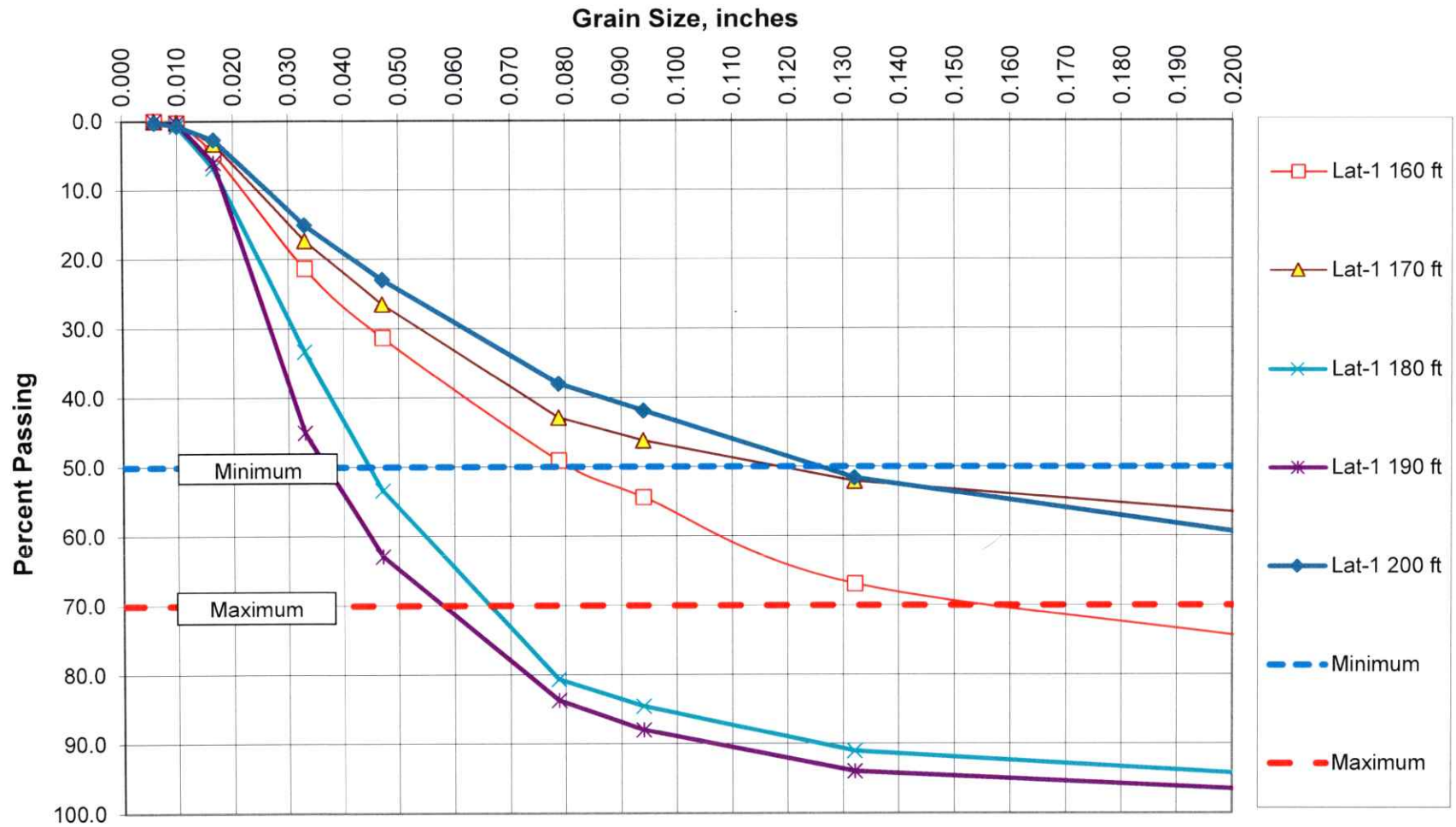
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1



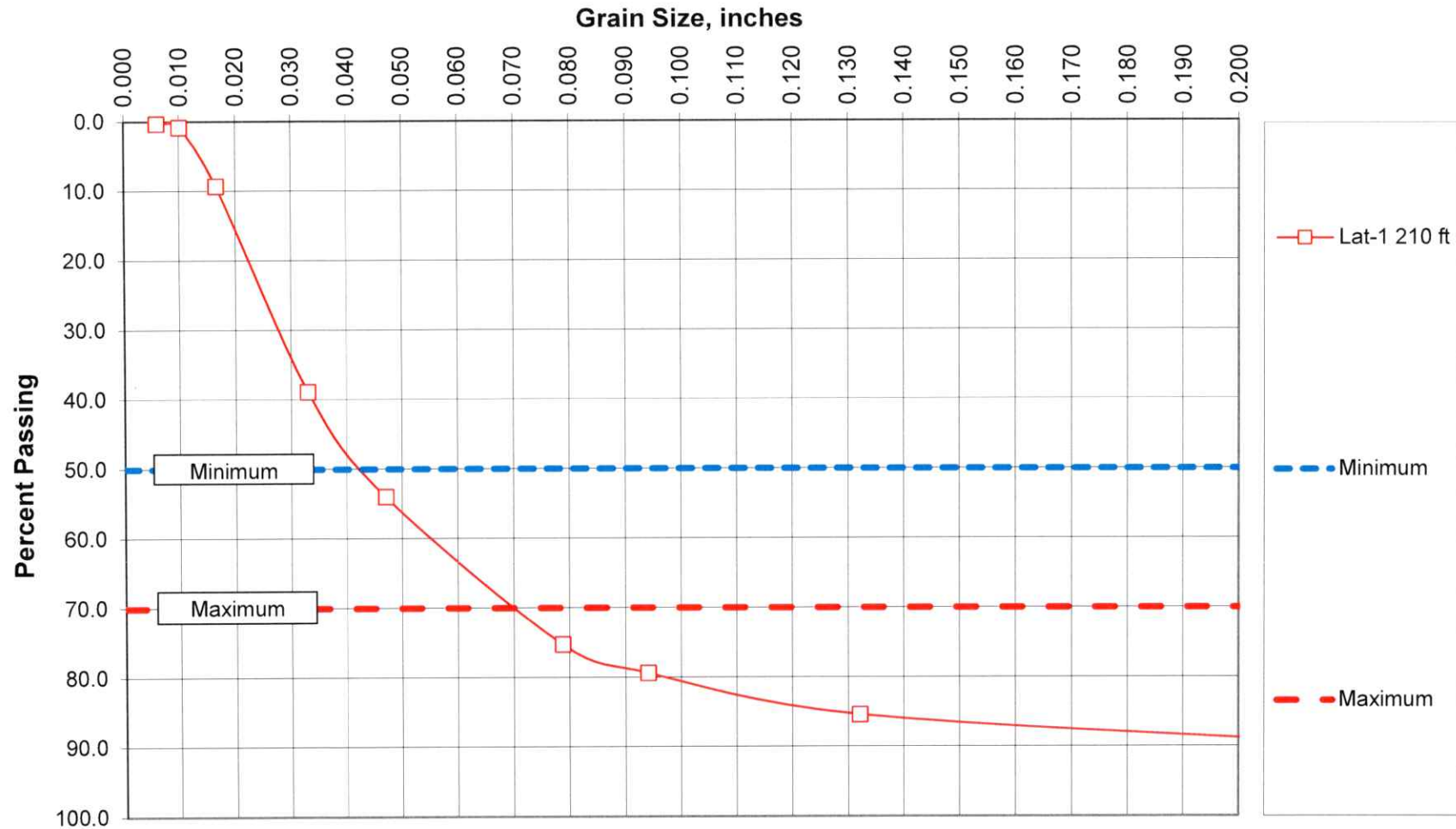
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1**



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1



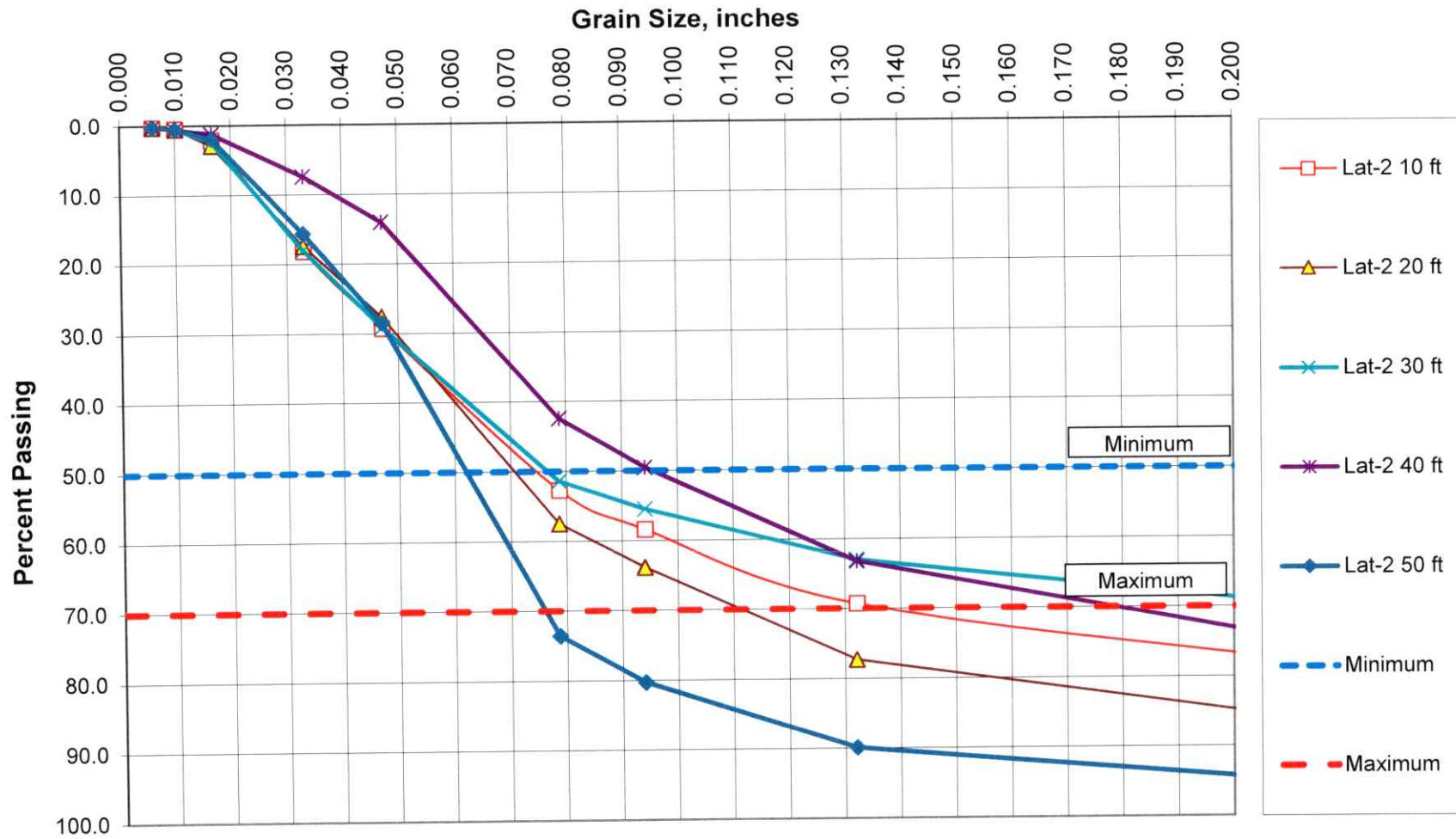
Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	1	
Lateral Length:	210	feet
Screen Length:	200	feet
Date Completed:	11/12/2021	

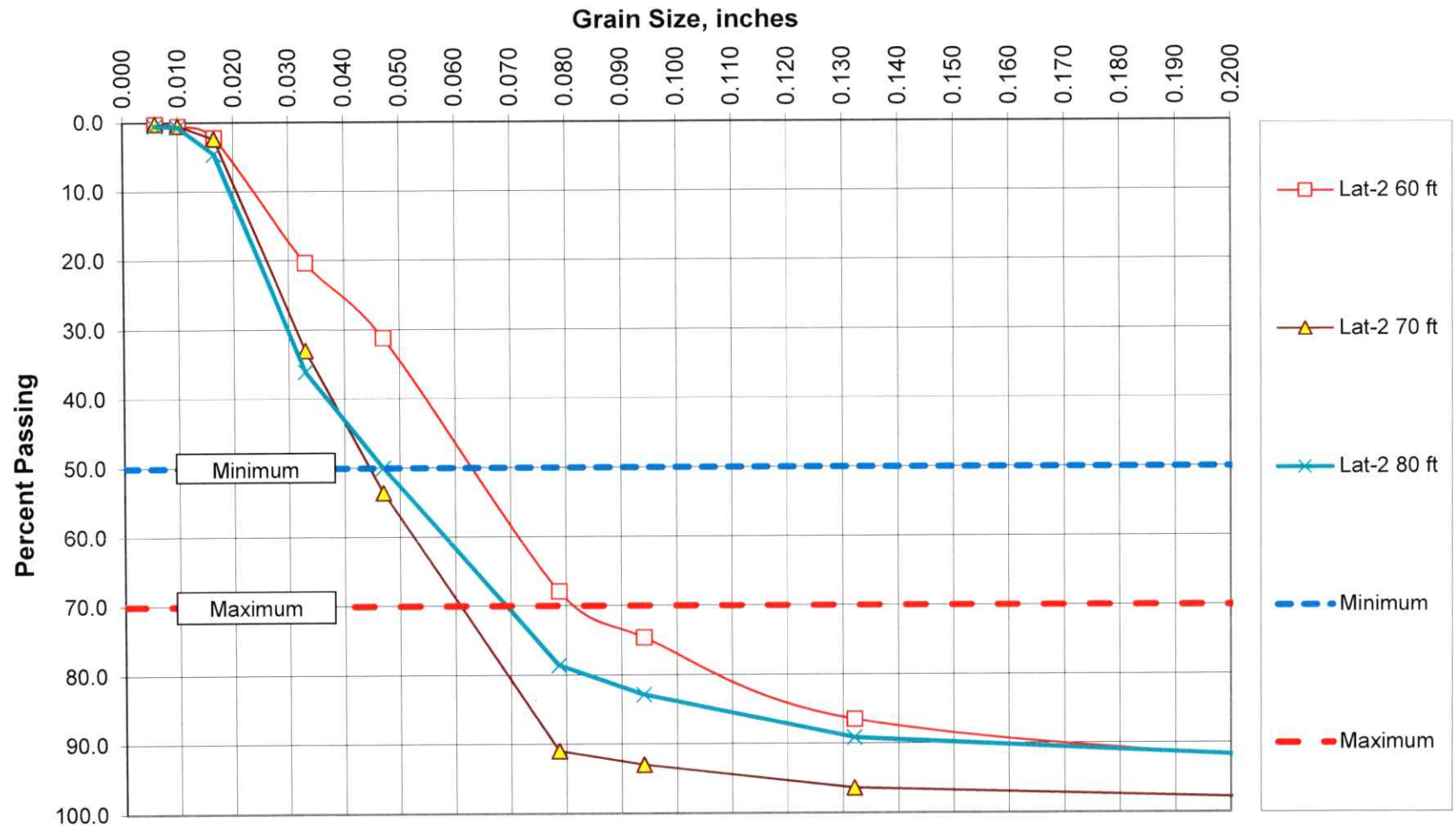
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	80	slot
20-30	80	slot
30-40	100	slot
40-50	80	slot
50-60	60	slot
60-70	80	slot
70-80	100	slot
80-90	125	slot
90-100	150	slot
100-110	150	slot
110-120	150	slot
120-130	125	slot
130-140	100	slot
140-150	100	slot
150-160	100	slot
160-170	80	slot
170-180	60	slot
180-190	50	slot
190-200	50	slot
200-210	50	slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	3	30
60	2	20
80	5	50
100	5	50
125	2	20
150	3	30
Total	21	210

**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 2**



**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 2**



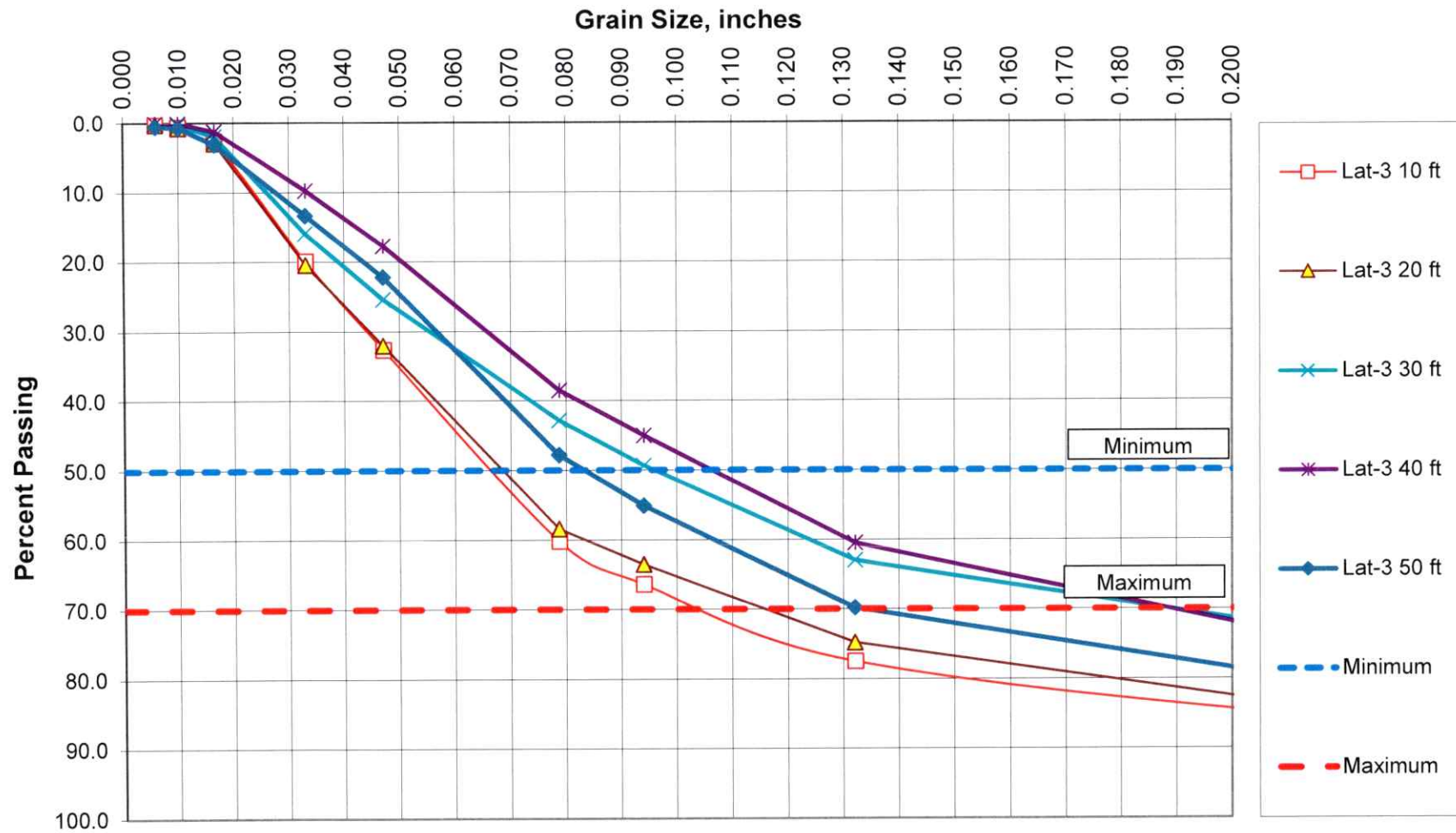
Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	2	
Lateral Length:	80	feet
Screen Length:	70	feet
Date Completed:	12/3/2021	

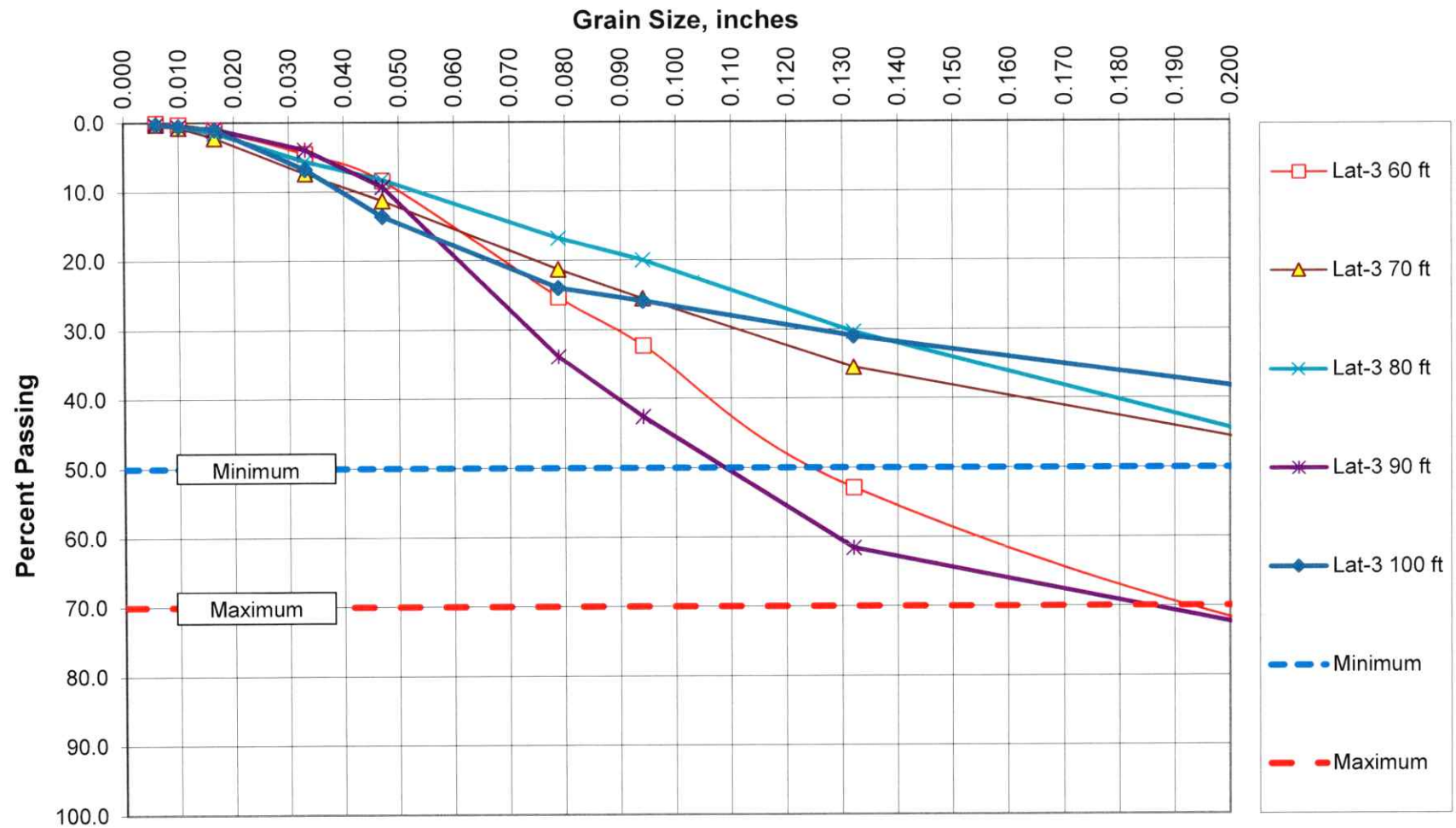
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	80	slot
20-30	80	slot
30-40	100	slot
40-50	100	slot
50-60	60	slot
60-70	60	slot
70-80	50	slot
80-90		slot
90-100		slot
100-110		slot
110-120		slot
120-130		slot
130-140		slot
140-150		slot
150-160		slot
160-170		slot
170-180		slot
180-190		slot
190-200		slot
200-210		slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	1	10
60	2	20
80	2	20
100	2	20
125	0	0
150	0	0
Total	8	80

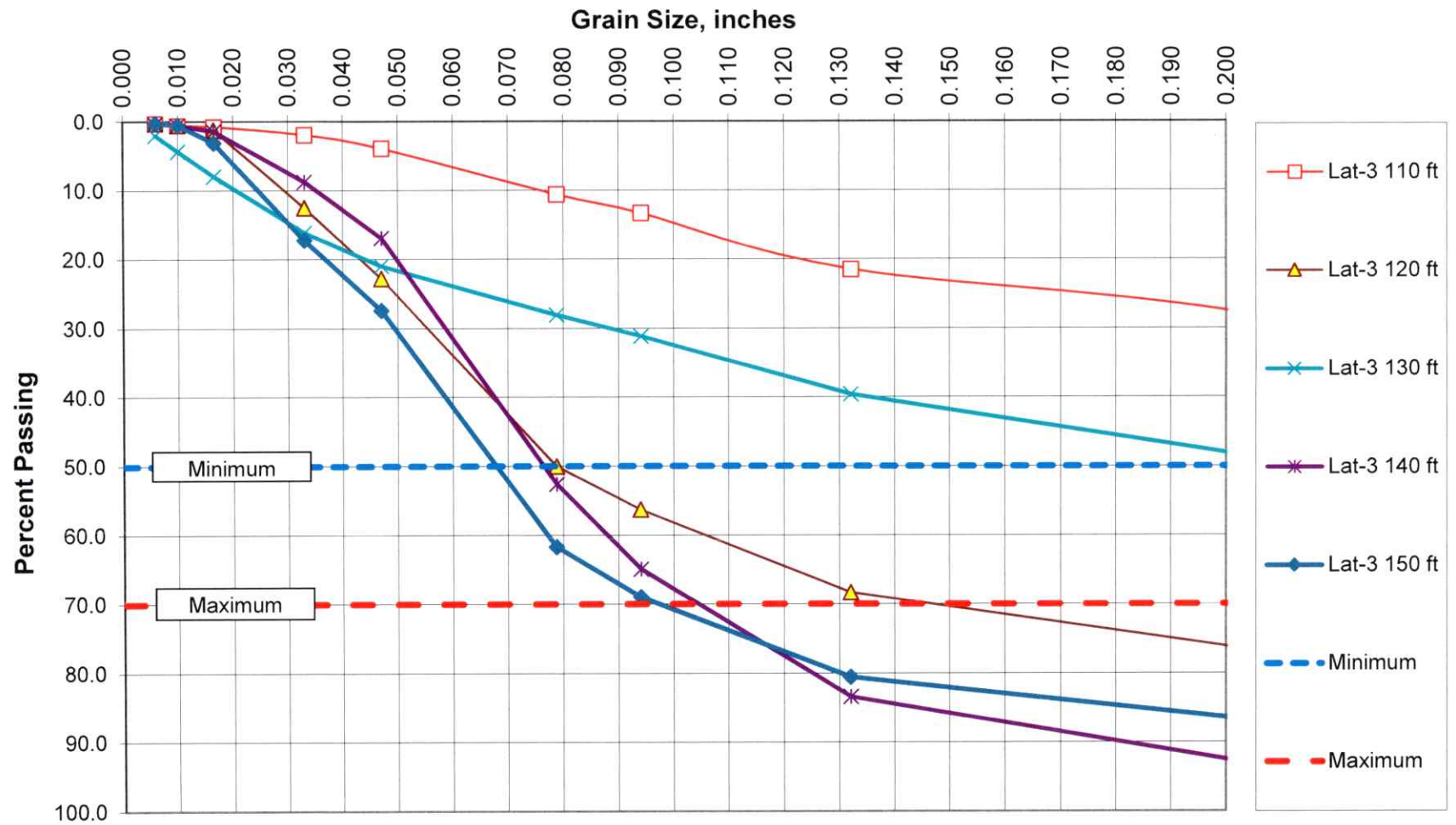
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3**



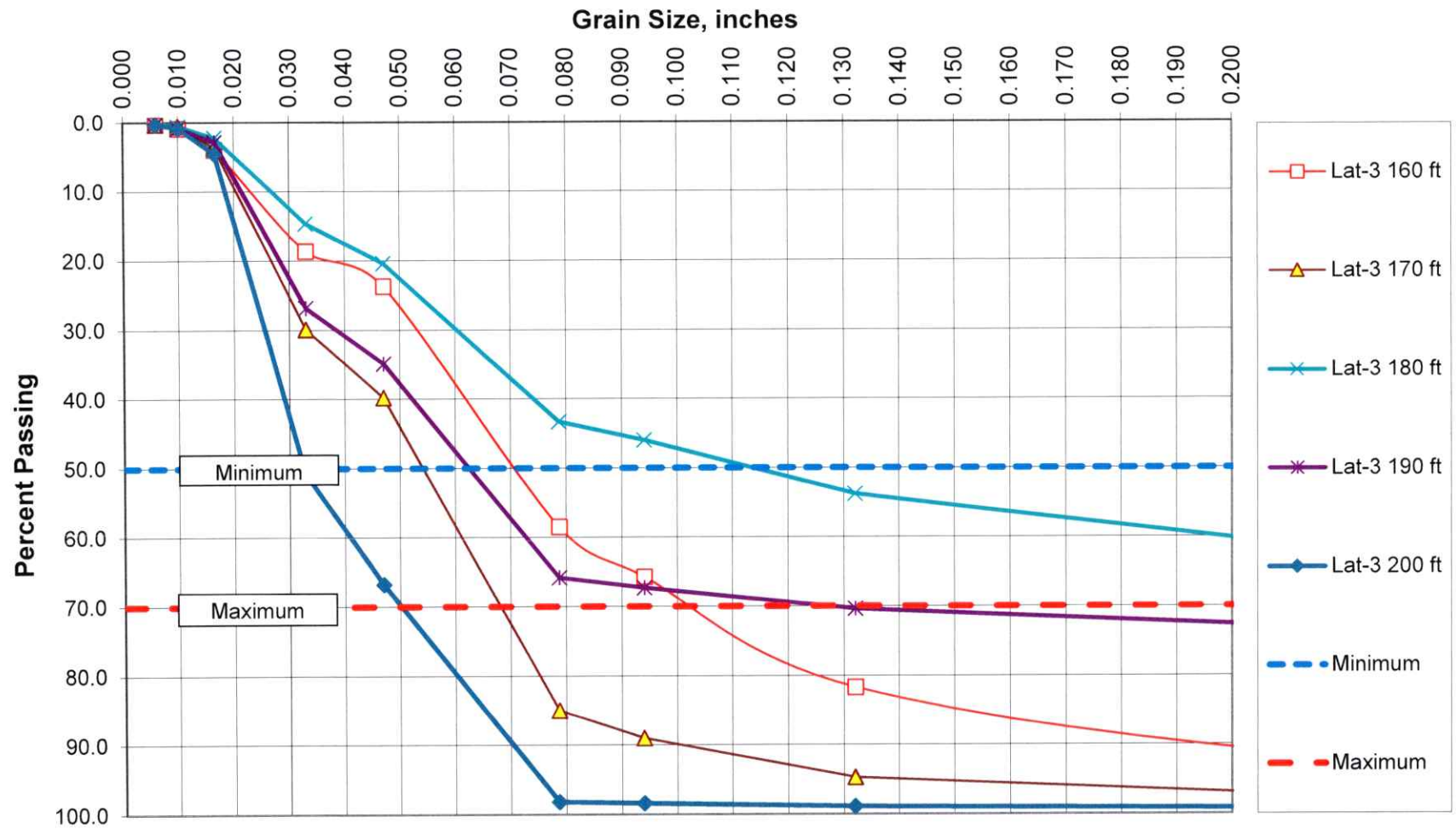
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3**



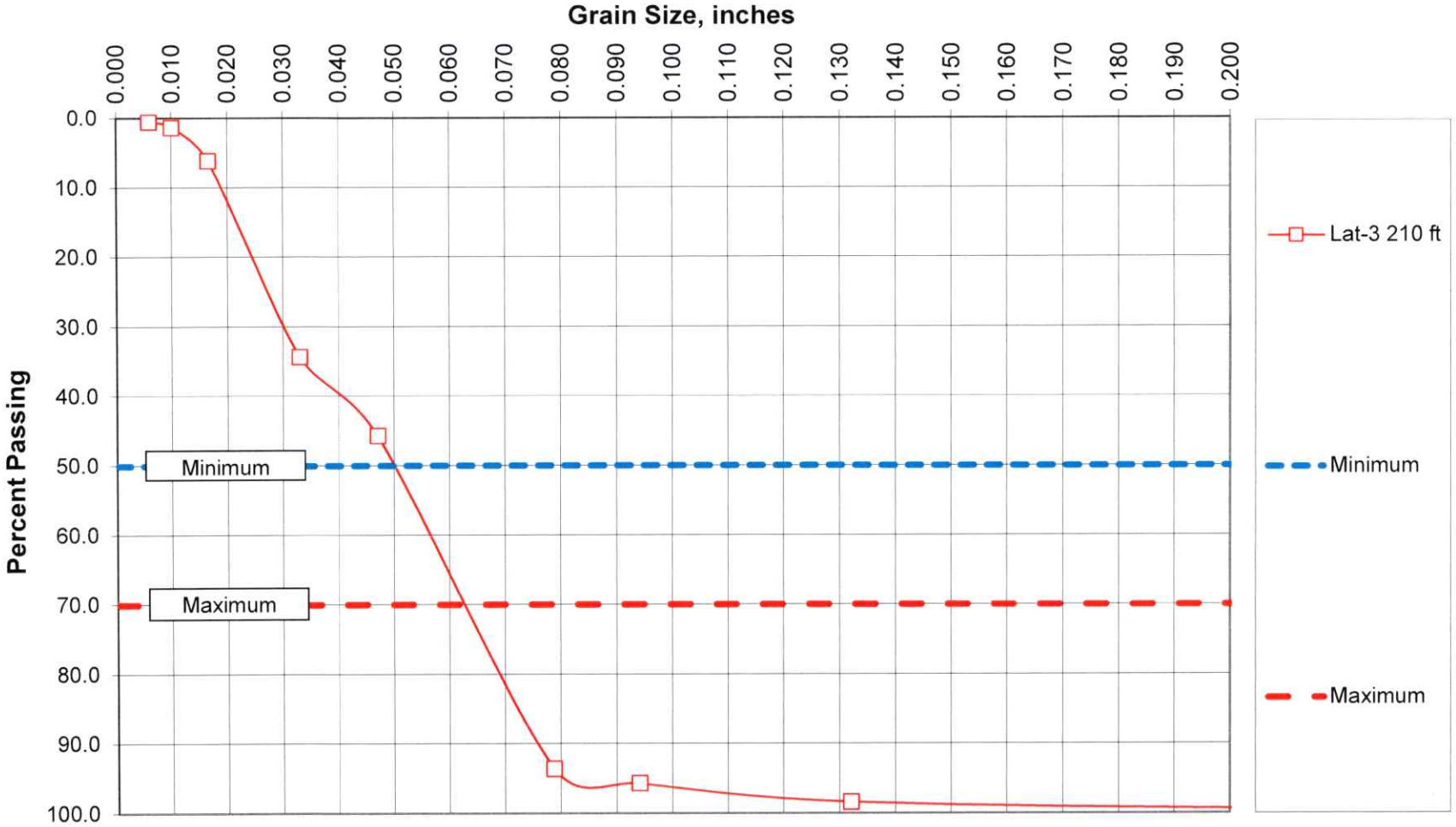
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3**



Grain Size Analyses
Sioux Falls, SD
Well 72
Lateral 3



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3



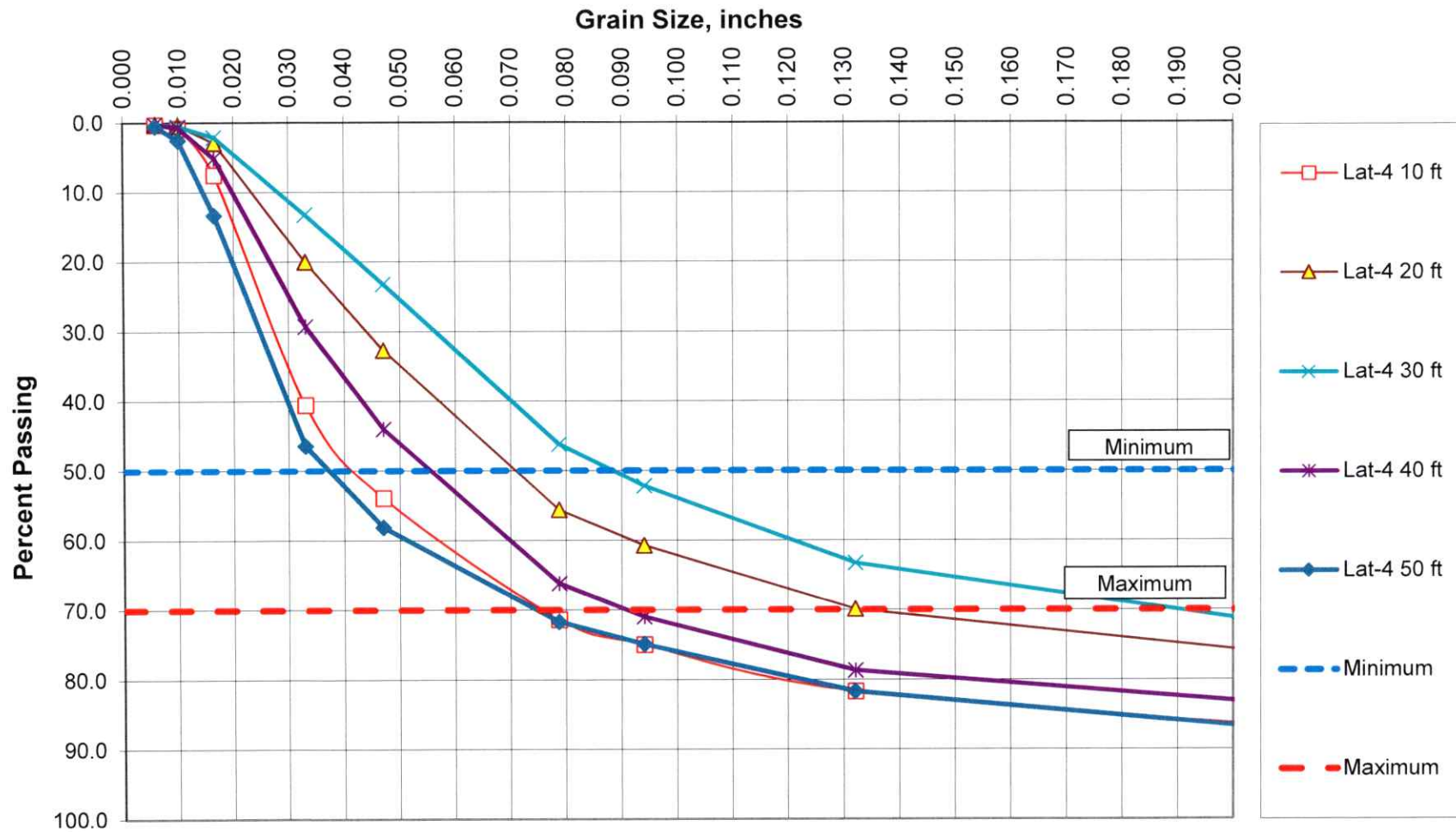
Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD
Well ID:	Collector Well 72
Lateral Number:	3
Lateral Length:	feet
Screen Length:	feet
Date Completed:	12/9/2021

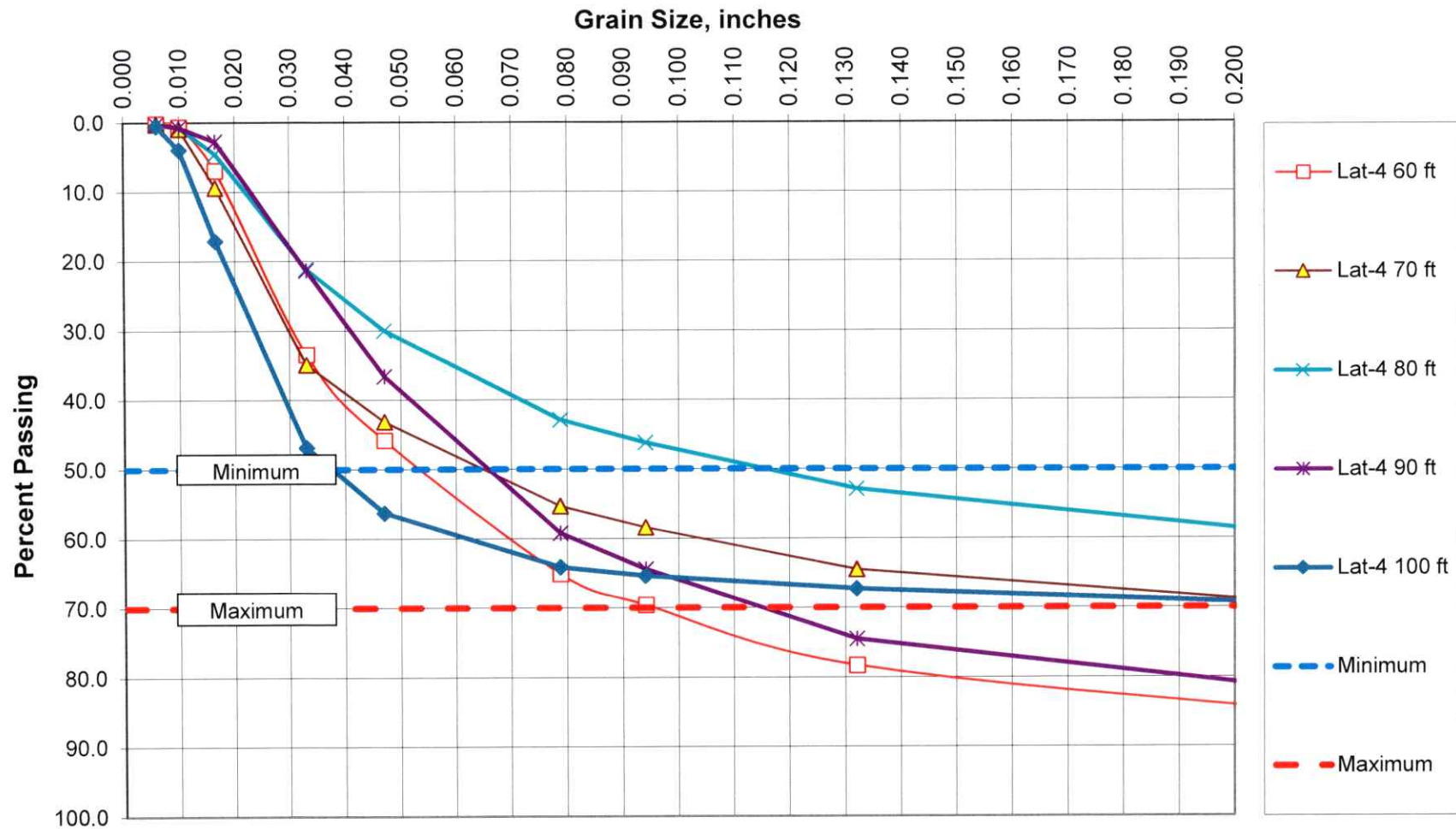
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	60	slot
20-30	80	slot
30-40	100	slot
40-50	125	slot
50-60	100	slot
60-70	125	slot
70-80	150	slot
80-90	150	slot
90-100	125	slot
100-110	150	slot
110-120	125	slot
120-130	100	slot
130-140	80	slot
140-150	80	slot
150-160	60	slot
160-170	60	slot
170-180	50	slot
180-190	60	slot
190-200	50	slot
200-210	30	slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	1	10
40	0	0
50	2	20
60	4	40
80	3	30
100	3	30
125	4	40
150	3	30
Total	21	210

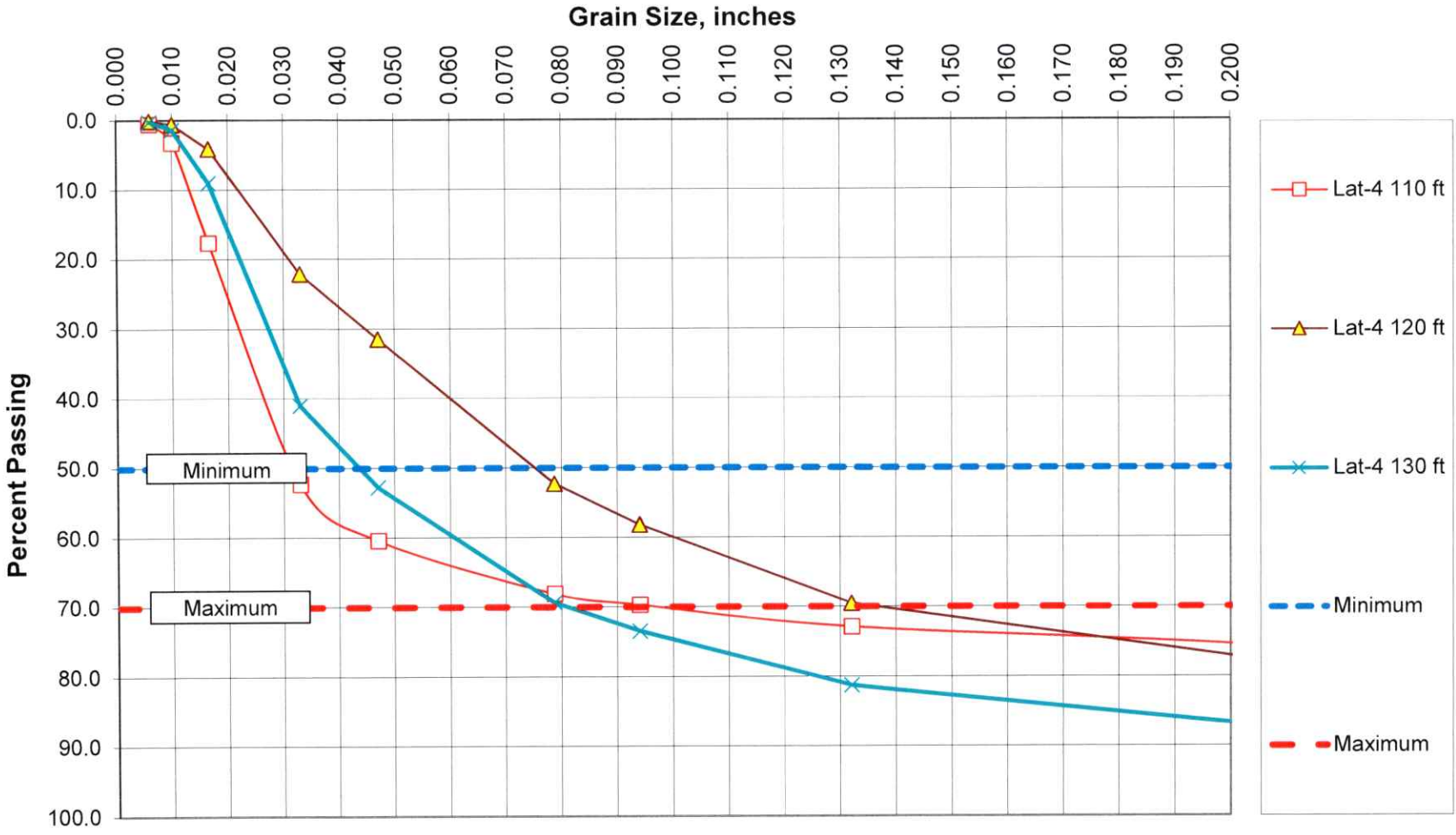
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 4**



**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 4**



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 4



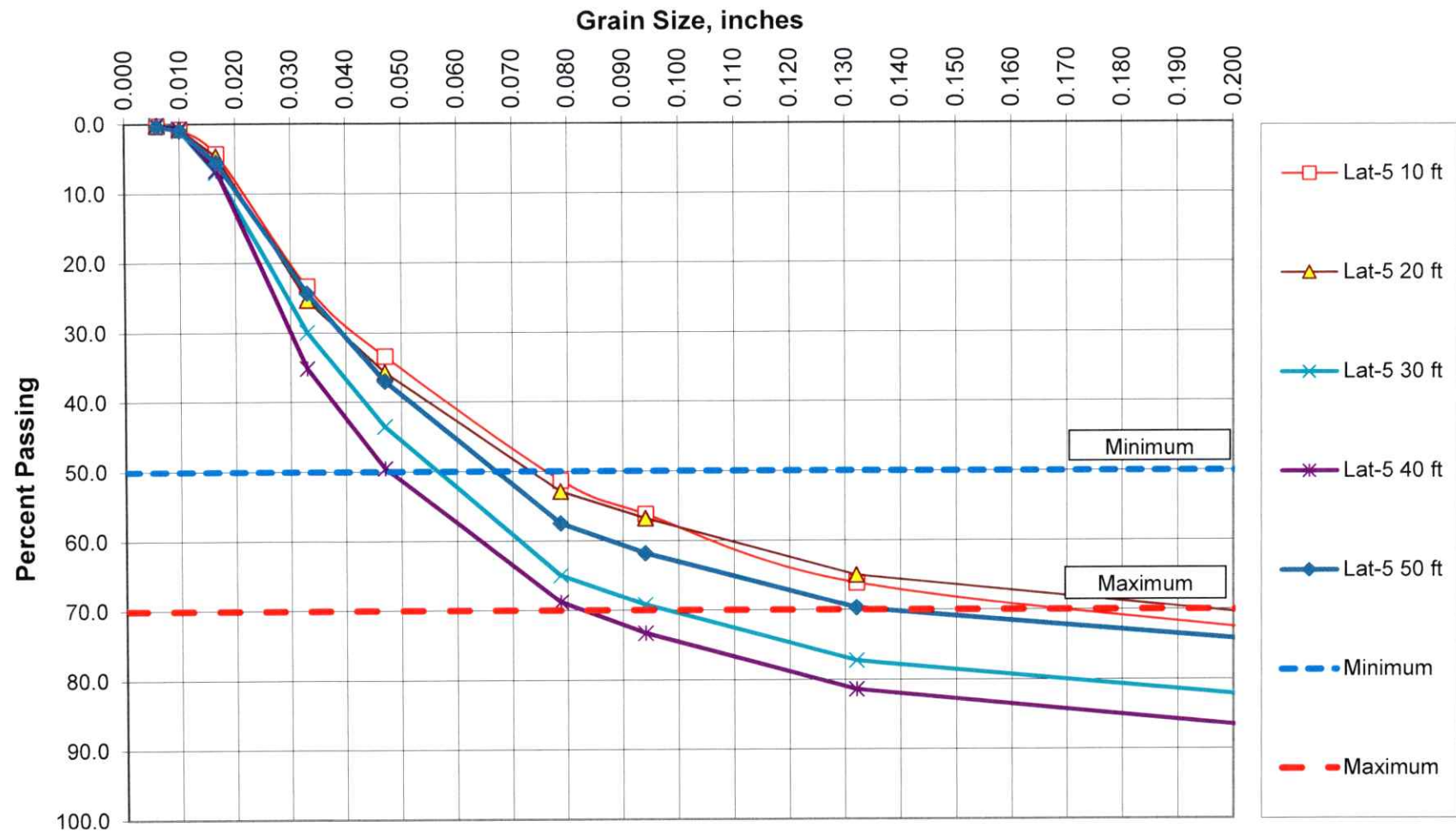
Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	4	
Lateral Length:	130	feet
Screen Length:	120	feet
Date Completed:	1/5/2022	

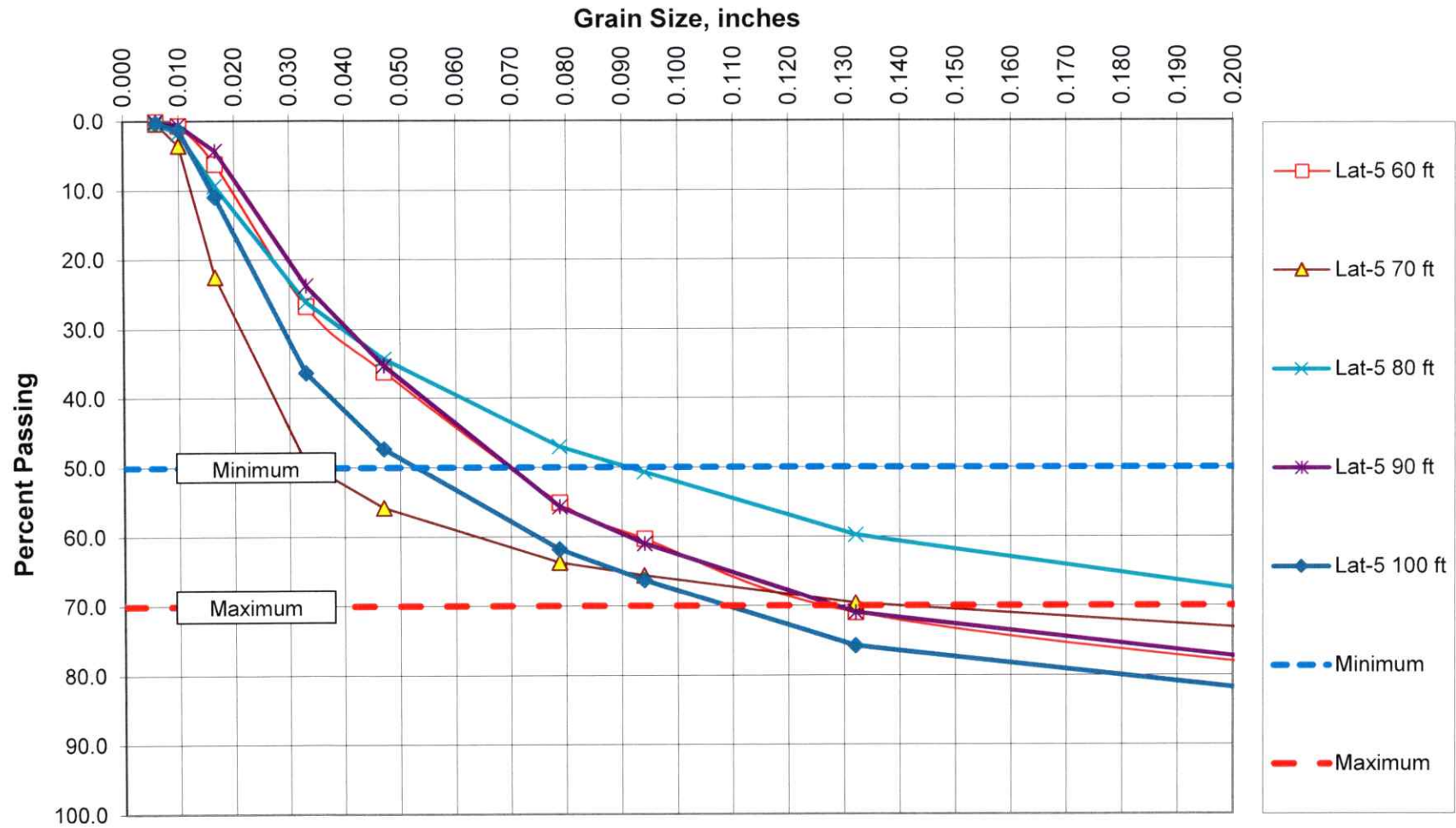
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	50	slot
20-30	80	slot
30-40	100	slot
40-50	60	slot
50-60	50	slot
60-70	60	slot
70-80	100	slot
80-90	125	slot
90-100	100	slot
100-110	80	slot
110-120	60	slot
120-130	60	slot
130-140		slot
140-150		slot
150-160		slot
160-170		slot
170-180		slot
180-190		slot
190-200		slot
200-210		slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	2	20
60	4	40
80	2	20
100	3	30
125	1	10
150	0	0
Total	13	130

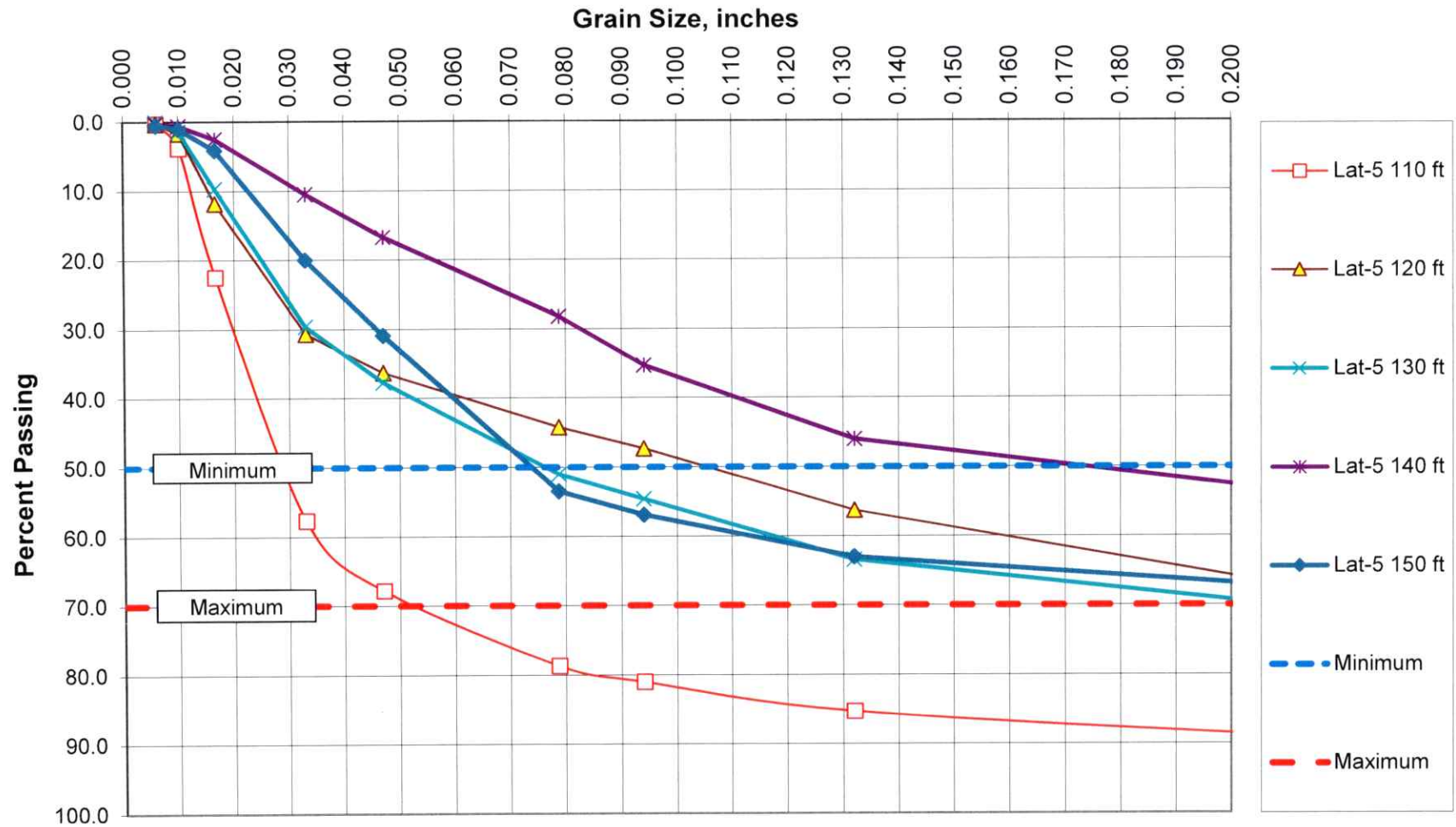
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5**



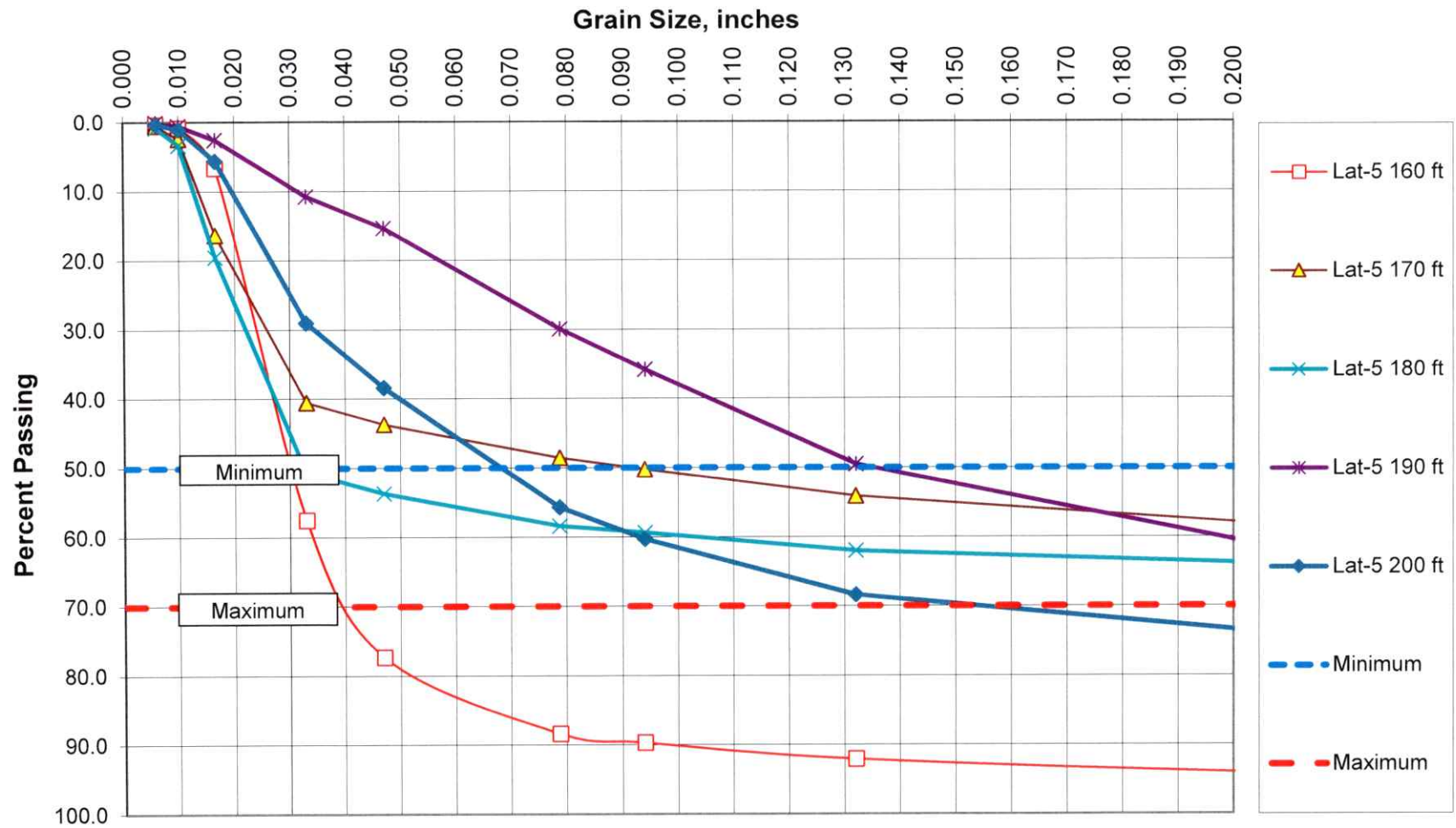
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5**



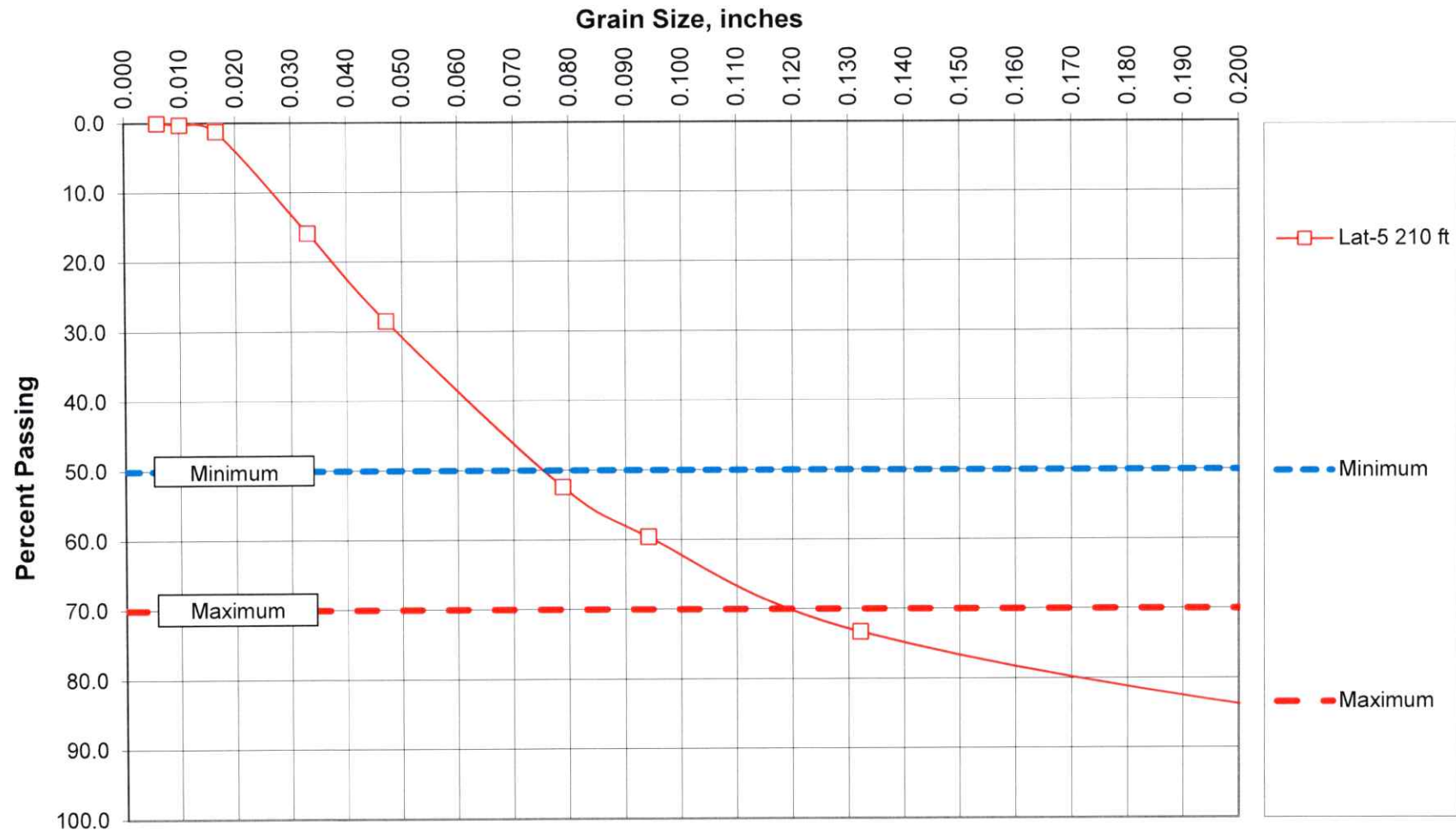
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5**



**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5**



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5



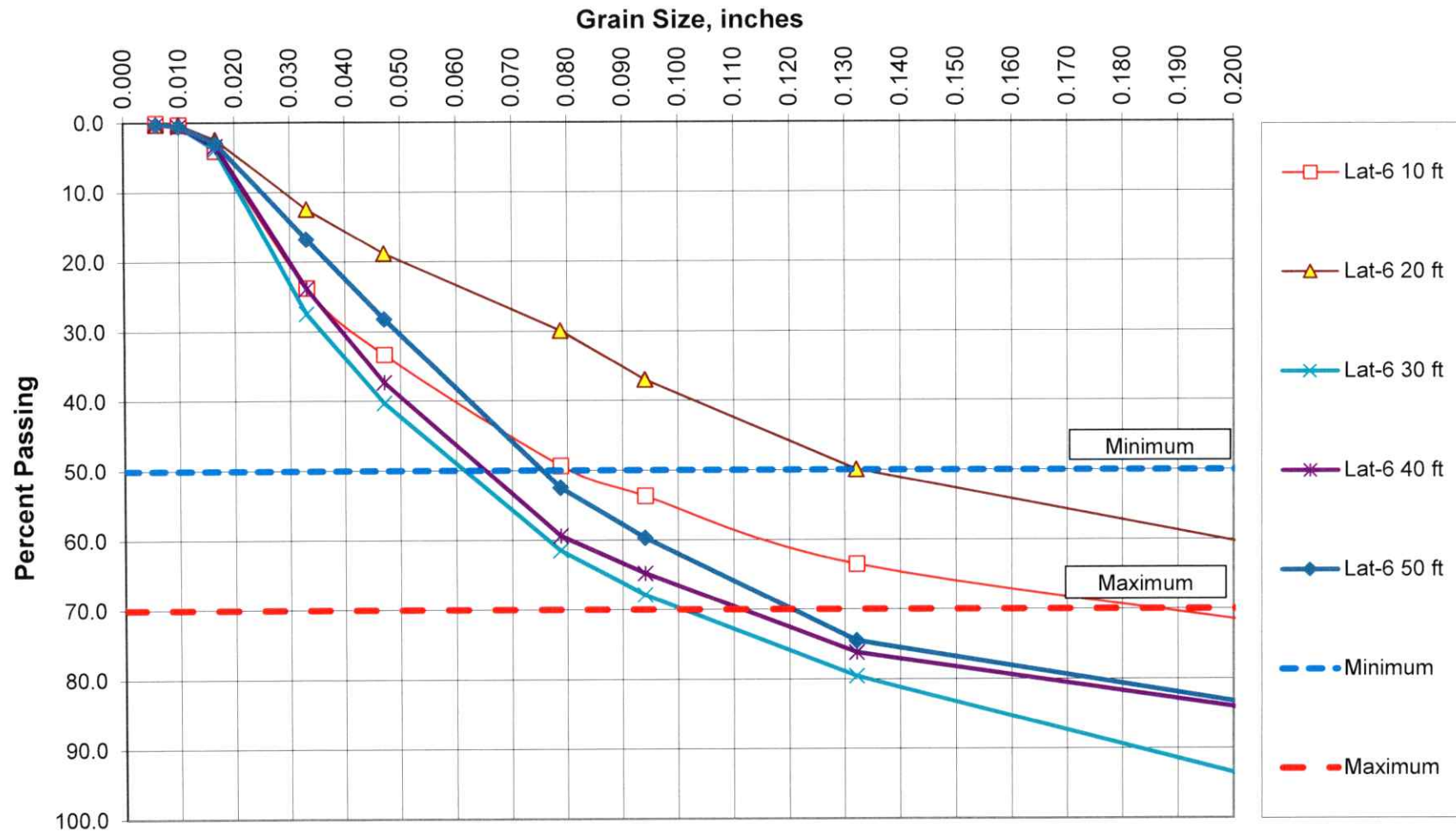
Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	5	
Lateral Length:	210	feet
Screen Length:	200	feet
Date Completed:	1/13/2022	

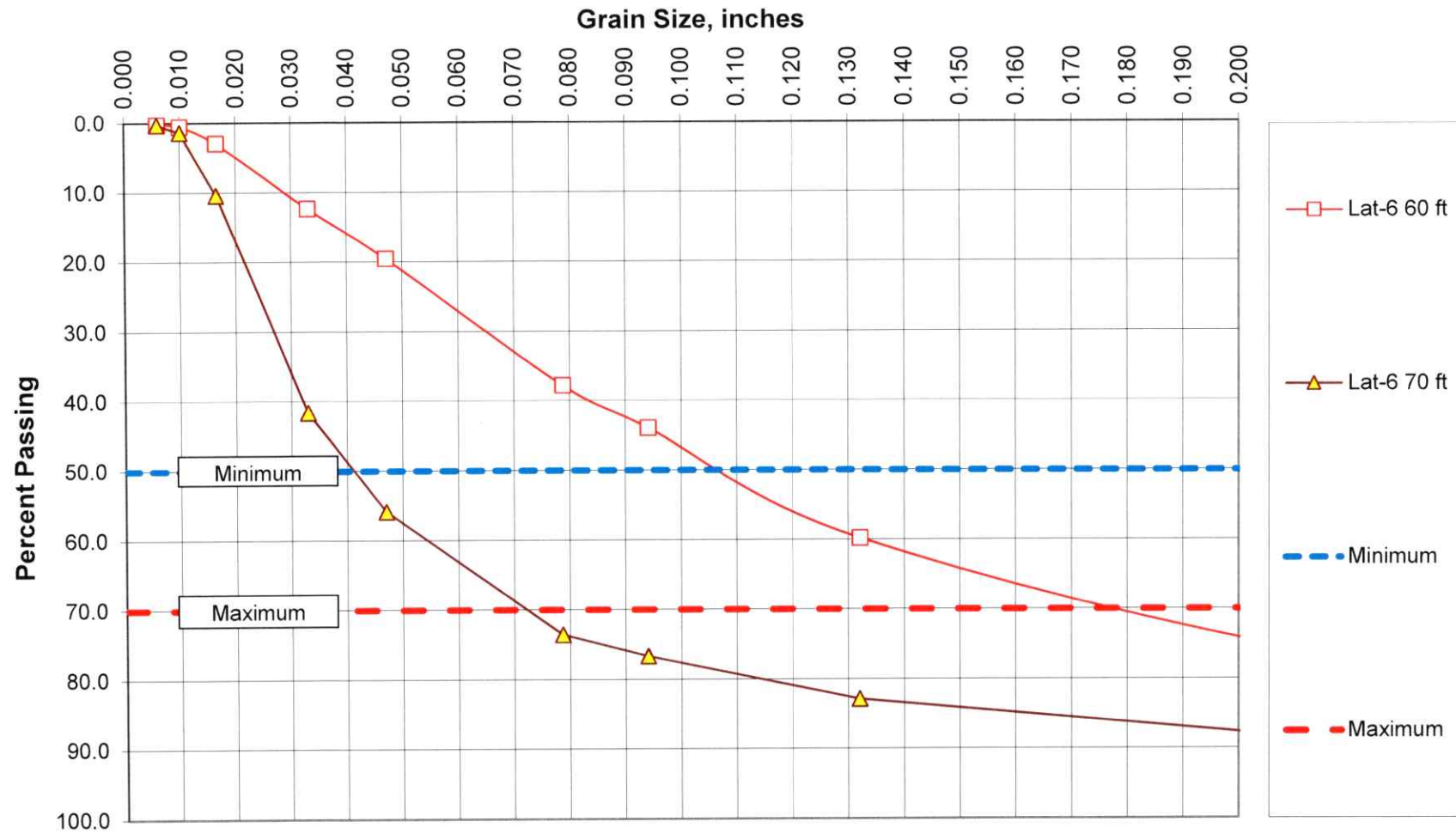
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	100	slot
20-30	80	slot
30-40	60	slot
40-50	60	slot
50-60	80	slot
60-70	80	slot
70-80	60	slot
80-90	100	slot
90-100	80	slot
100-110	60	slot
110-120	40	slot
120-130	80	slot
130-140	120	slot
140-150	120	slot
150-160	80	slot
160-170	30	slot
170-180	80	slot
180-190	120	slot
190-200	120	slot
200-210	120	slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	1	10
40	1	10
50	0	0
60	4	40
80	7	70
100	2	20
120	5	50
150	0	0
Total	21	210

**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 6**



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 6



Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	6	
Lateral Length:	70	feet
Screen Length:	60	feet
Date Completed:	1/18/2022	

Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	100	slot
20-30	125	slot
30-40	80	slot
40-50	80	slot
50-60	100	slot
60-70	60	slot
70-80		slot
80-90		slot
90-100		slot
100-110		slot
110-120		slot
120-130		slot
130-140		slot
140-150		slot
150-160		slot
160-170		slot
170-180		slot
180-190		slot
190-200		slot
200-210		slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	0	0
60	1	10
80	2	20
100	2	20
125	1	10
150	0	0
Total	7	70

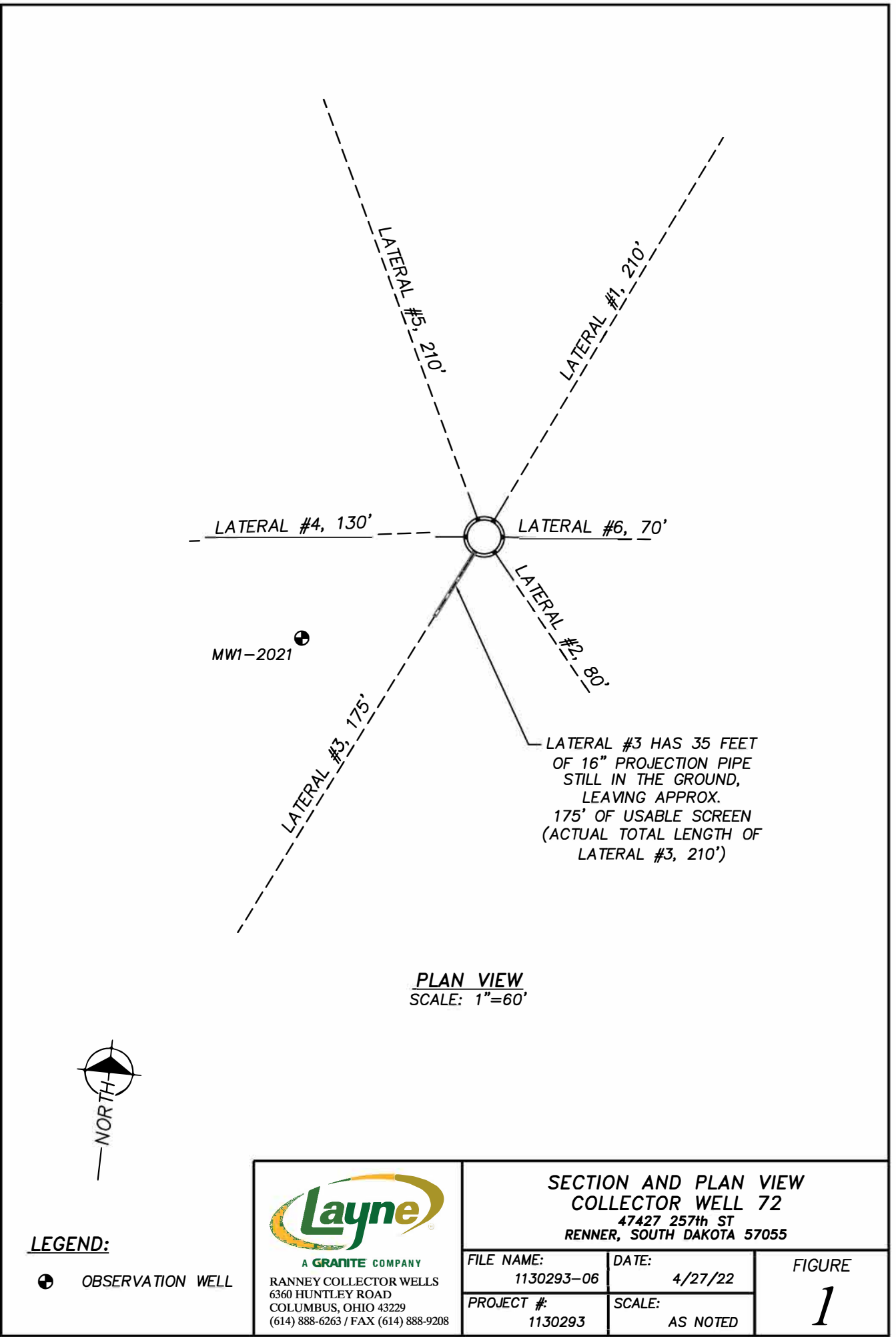
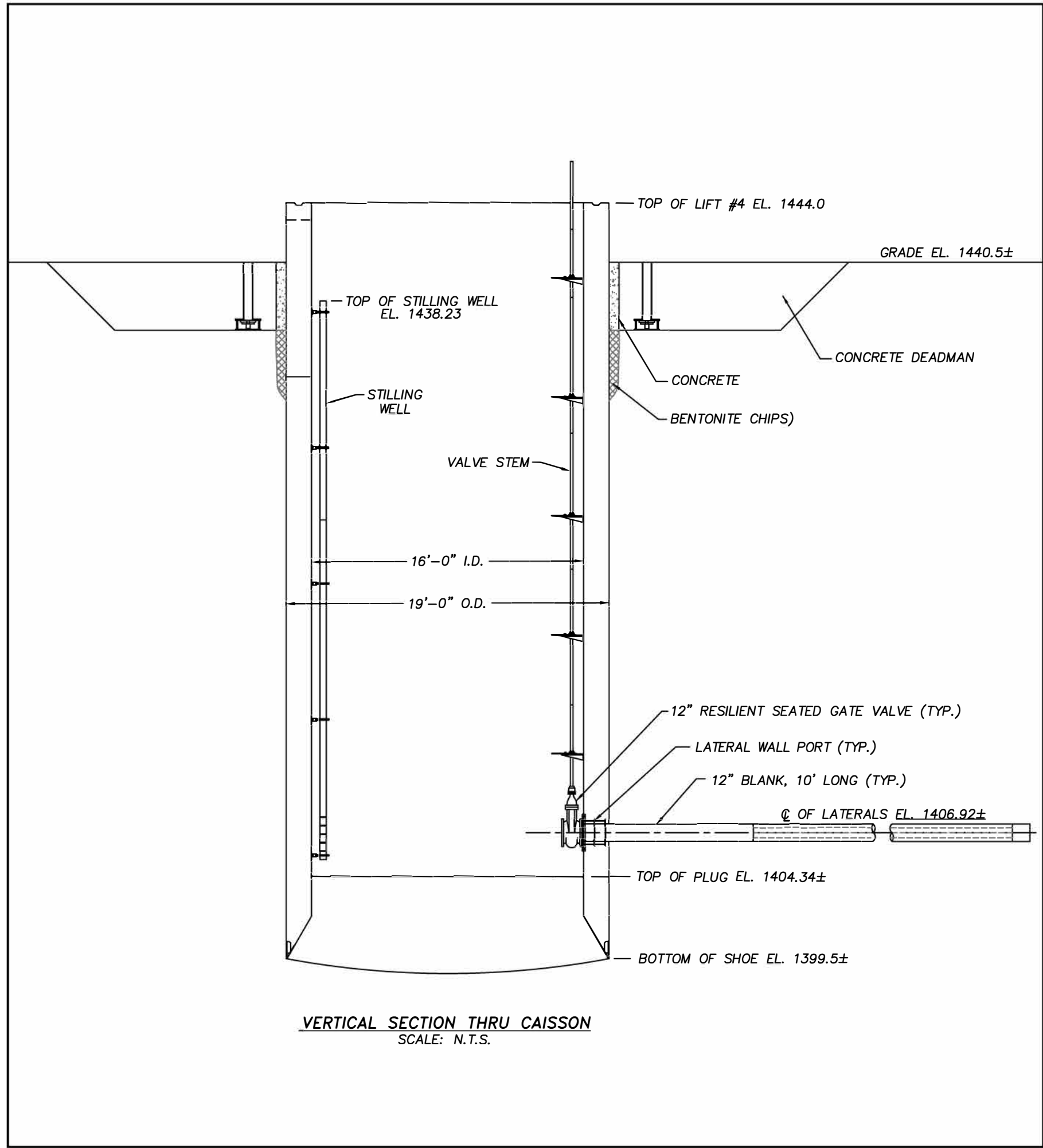


TABLE 1 (continued)
Collector Well 72 Well Design Summary
City of Sioux Falls, South Dakota

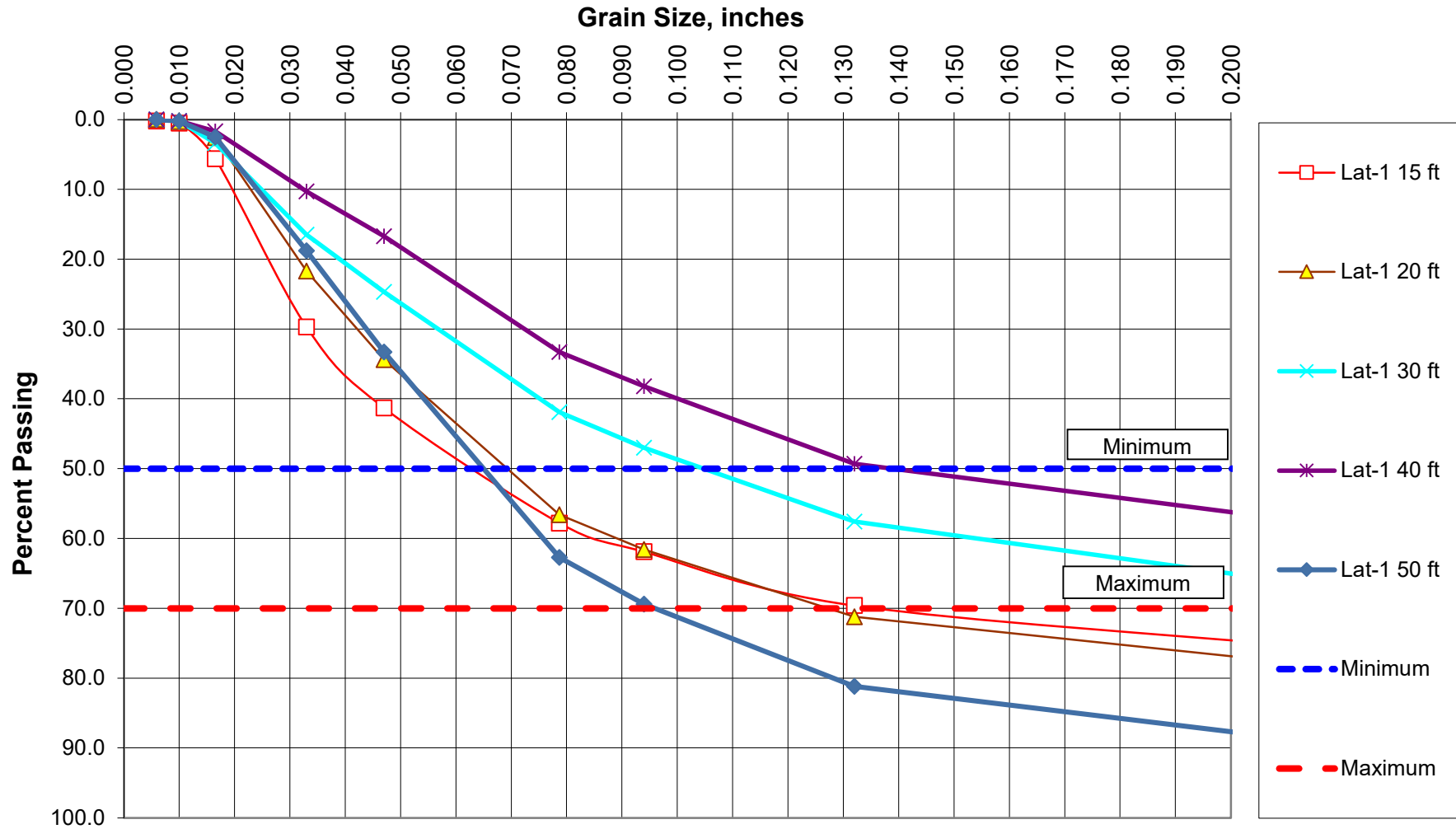
SCREEN MATERIAL: 12.75-inch OD, 12-inch ID, Type 130 Wire-Wound Stainless Steel (wire width 0.130-inch)

LATERAL SCREEN SLOT SIZE PLACEMENT (feet from inside caisson wall)

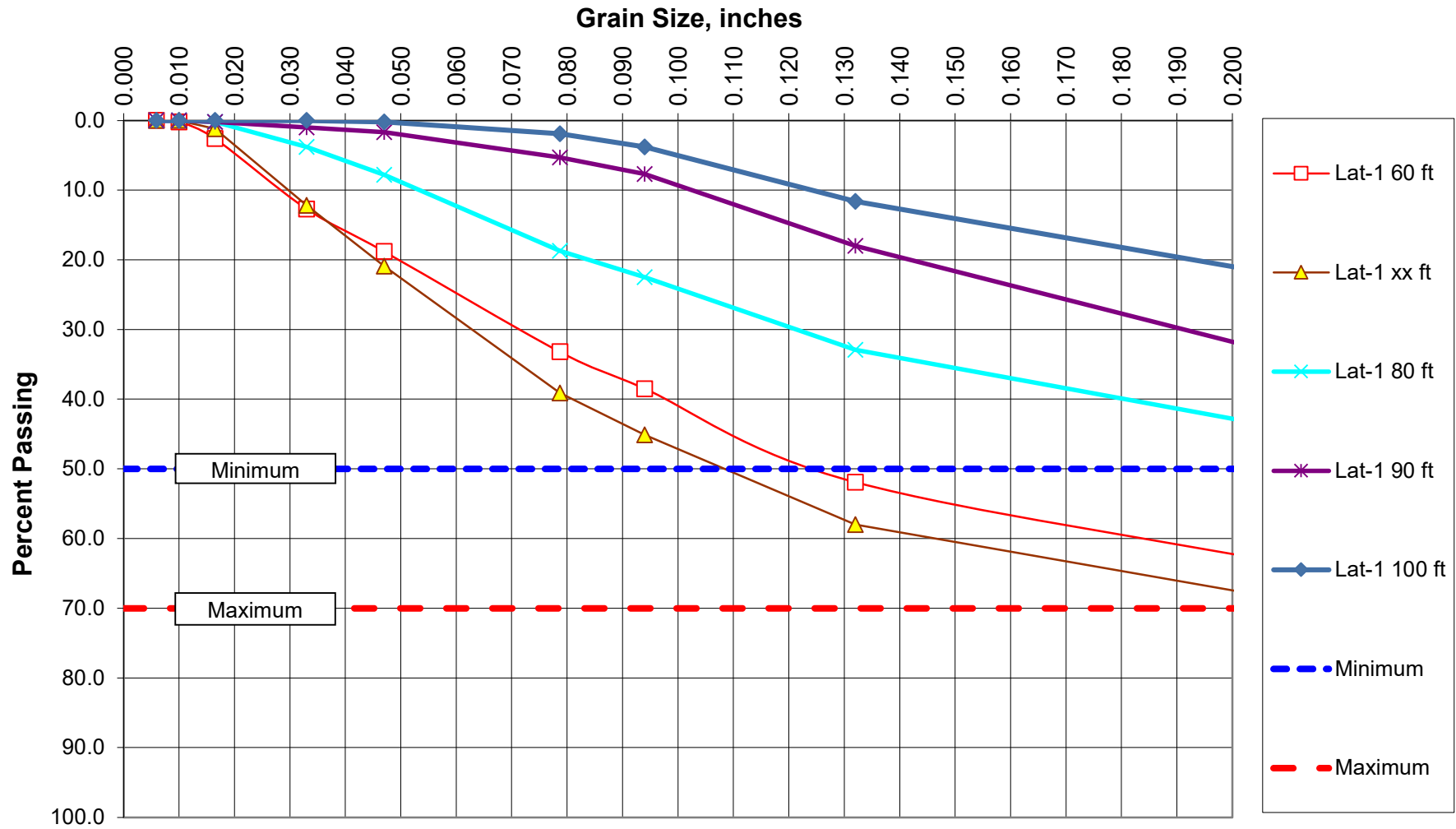
Lateral Number	SCREEN SLOT SIZE (inches)								
	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.125	0.150
1			180-190 190-200 200-210	50-60 170-180	10-20 20-30 40-50 60-70 160-170	30-40 70-80 130-140 140-150 150-160		80-90 120-130	90-100 100-110 110-120
2			70-80	50-60 60-70	10-20 20-30	30-40 40-50			
3	200-210		170-180 190-200	150-160 160-170 180-190	130-140 140-150	35-40 50-60 120-130		40-50 60-70 90-100 110-120	70-80 80-90 100-110
4			10-20 50-60	40-50 60-70 110-120 120-130	20-30 100-110	30-40 70-80 90-100		80-90	
5	160-170	110-120		30-40 40-50 70-80 100-110	20-30 50-60 60-70 90-100 120-130 150-160 170-180	10-20 80-90	130-140 140-150 180-190 190-200 200-210		
6				60-70	30-40 40-50	10-20 50-60		20-30	
Total Length	20	10	80	160	200	165	50	80	60

TOTAL SCREEN OPEN AREA (Adjusted for couplings and blank sections): 1,023 ft²

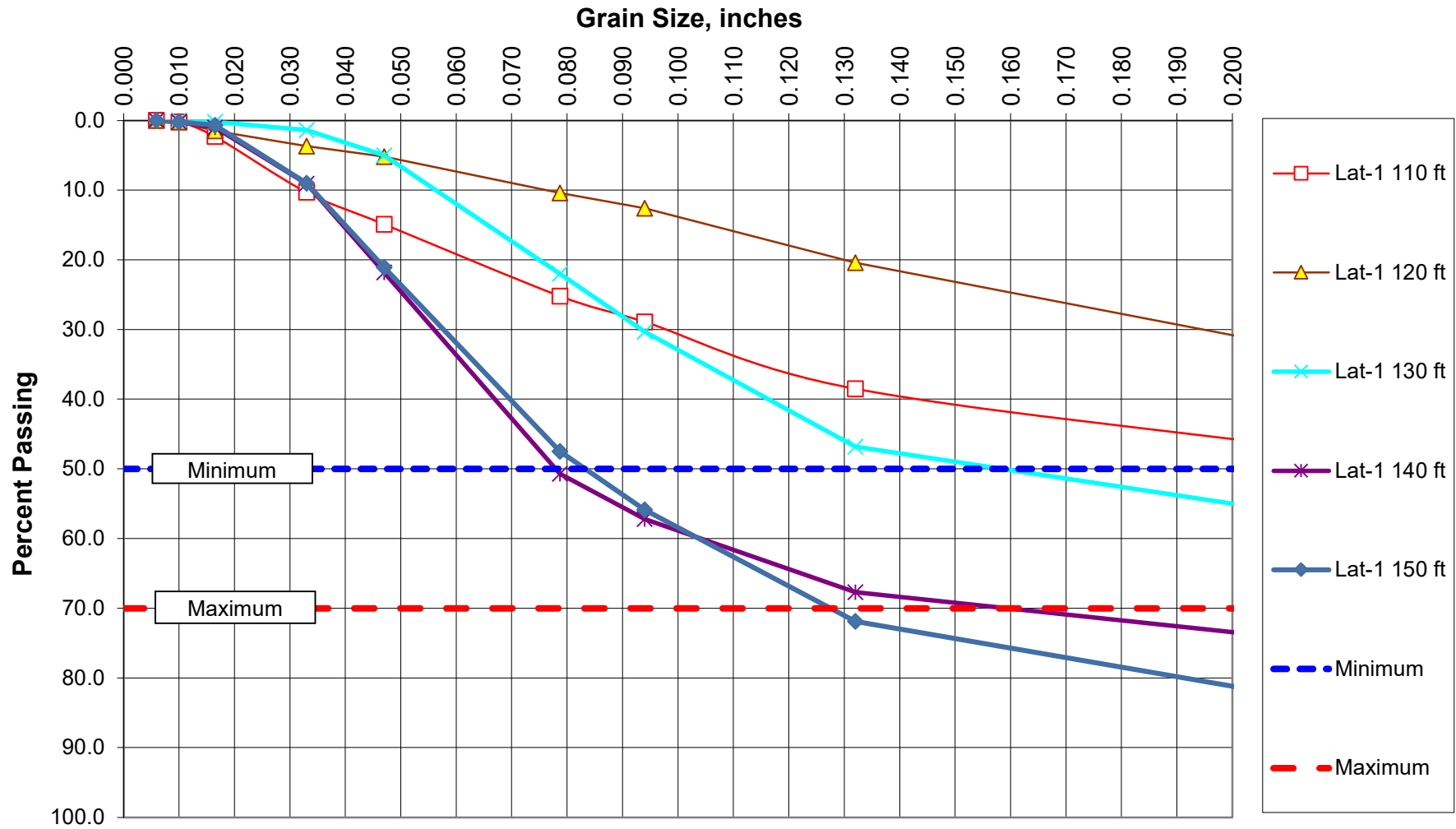
**Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1**



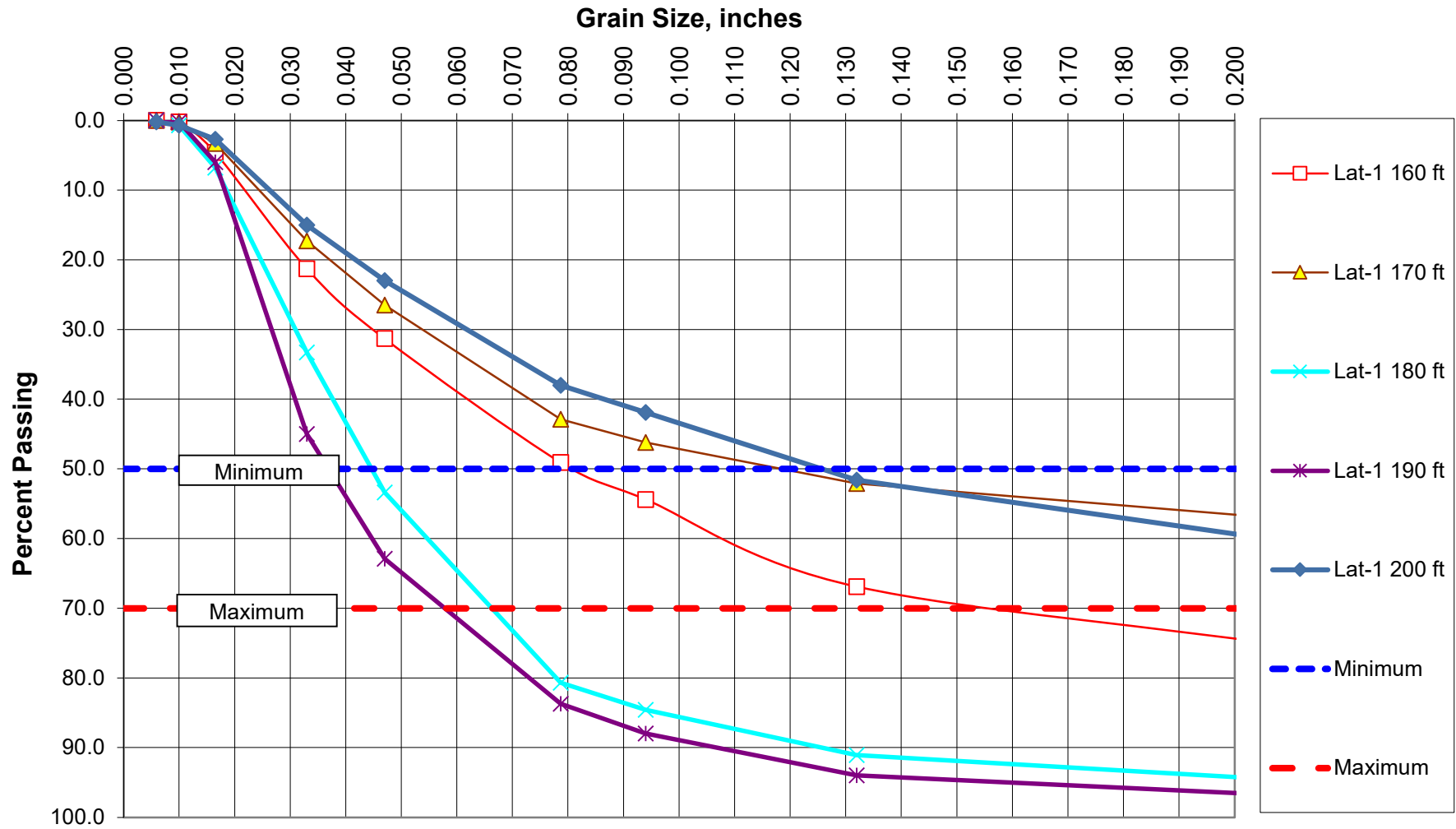
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1



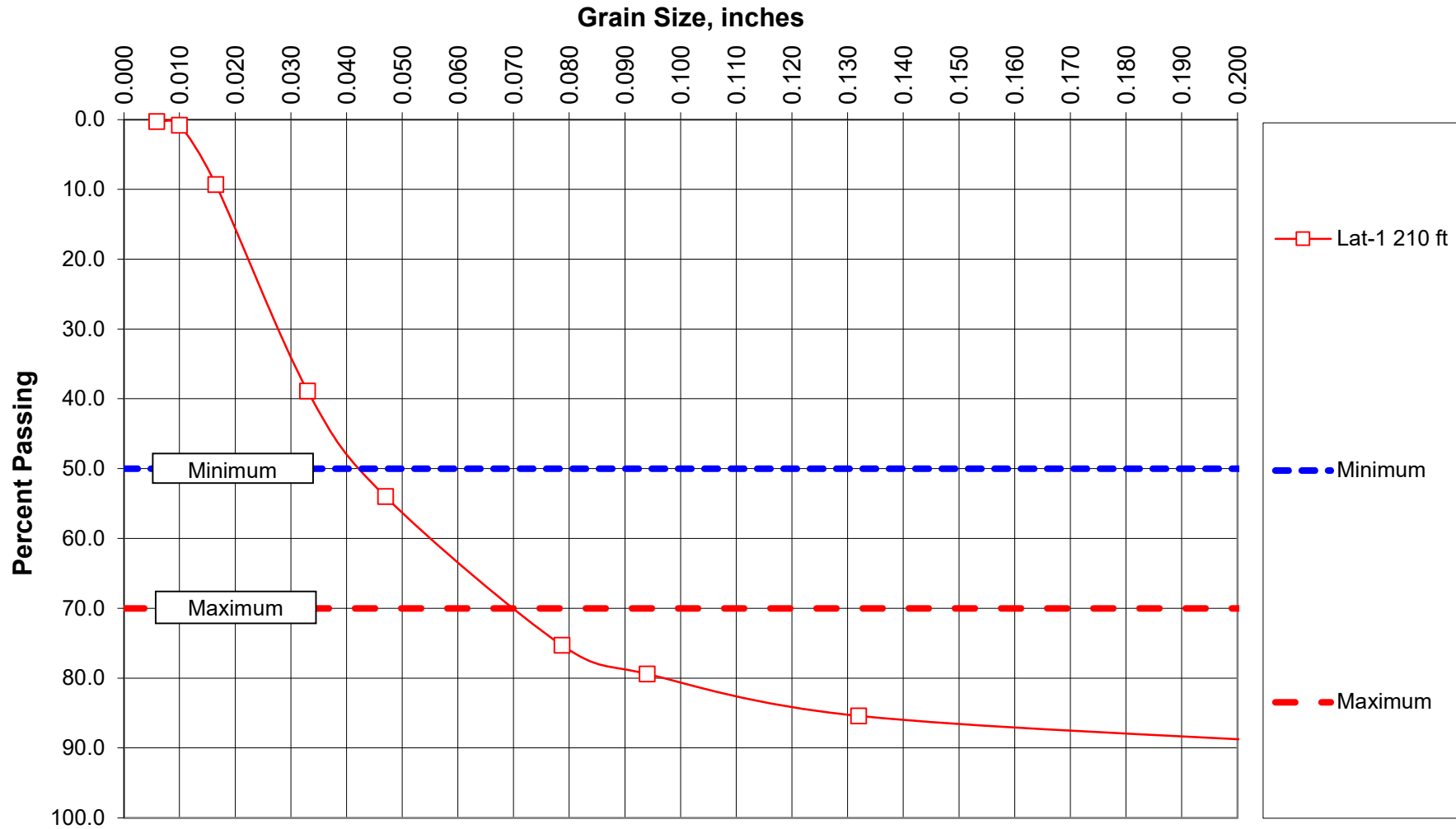
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 1



Collector Well

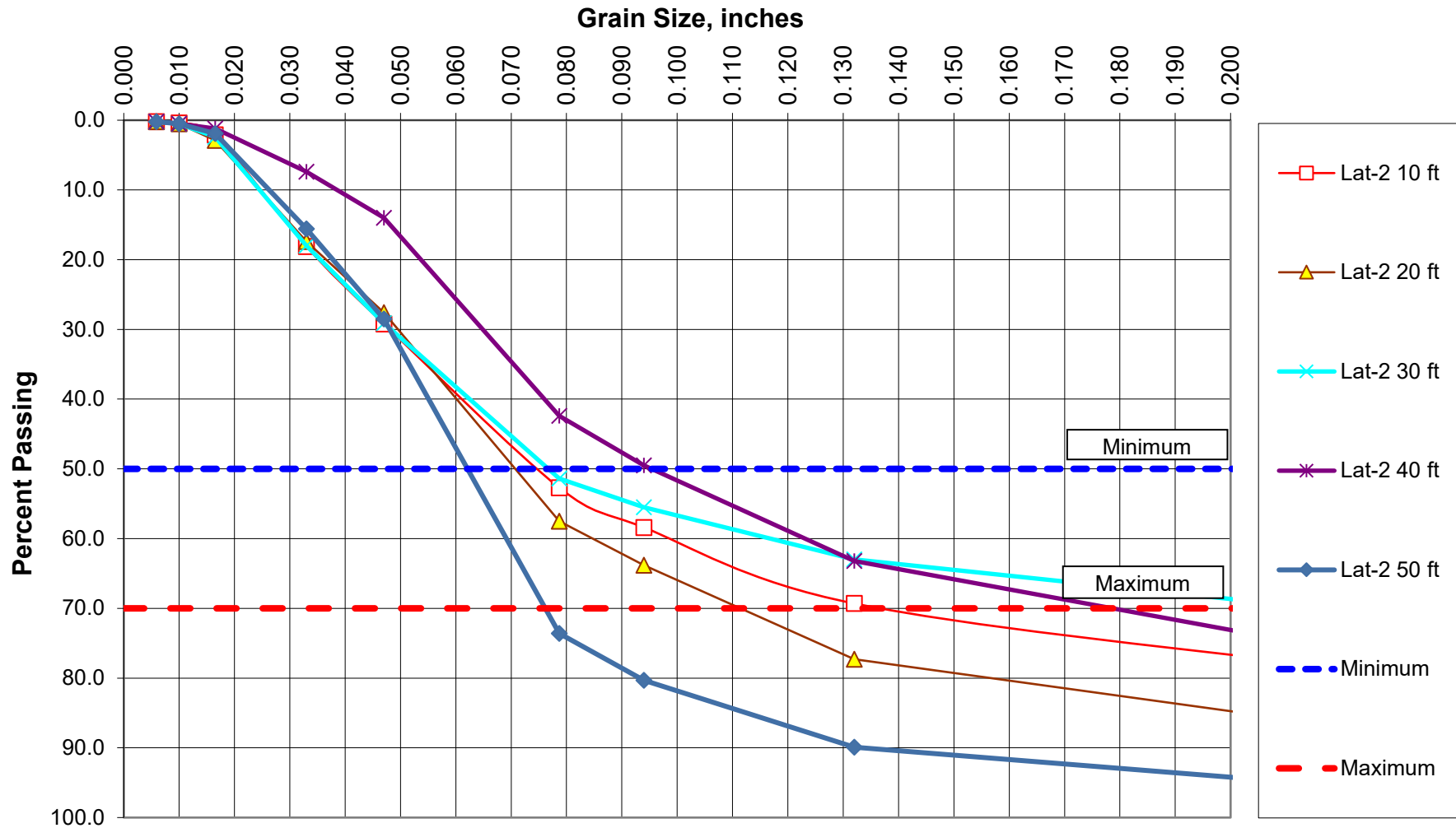
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	1	
Lateral Length:	210	feet
Screen Length:	200	feet
Date Completed:	11/12/2021	

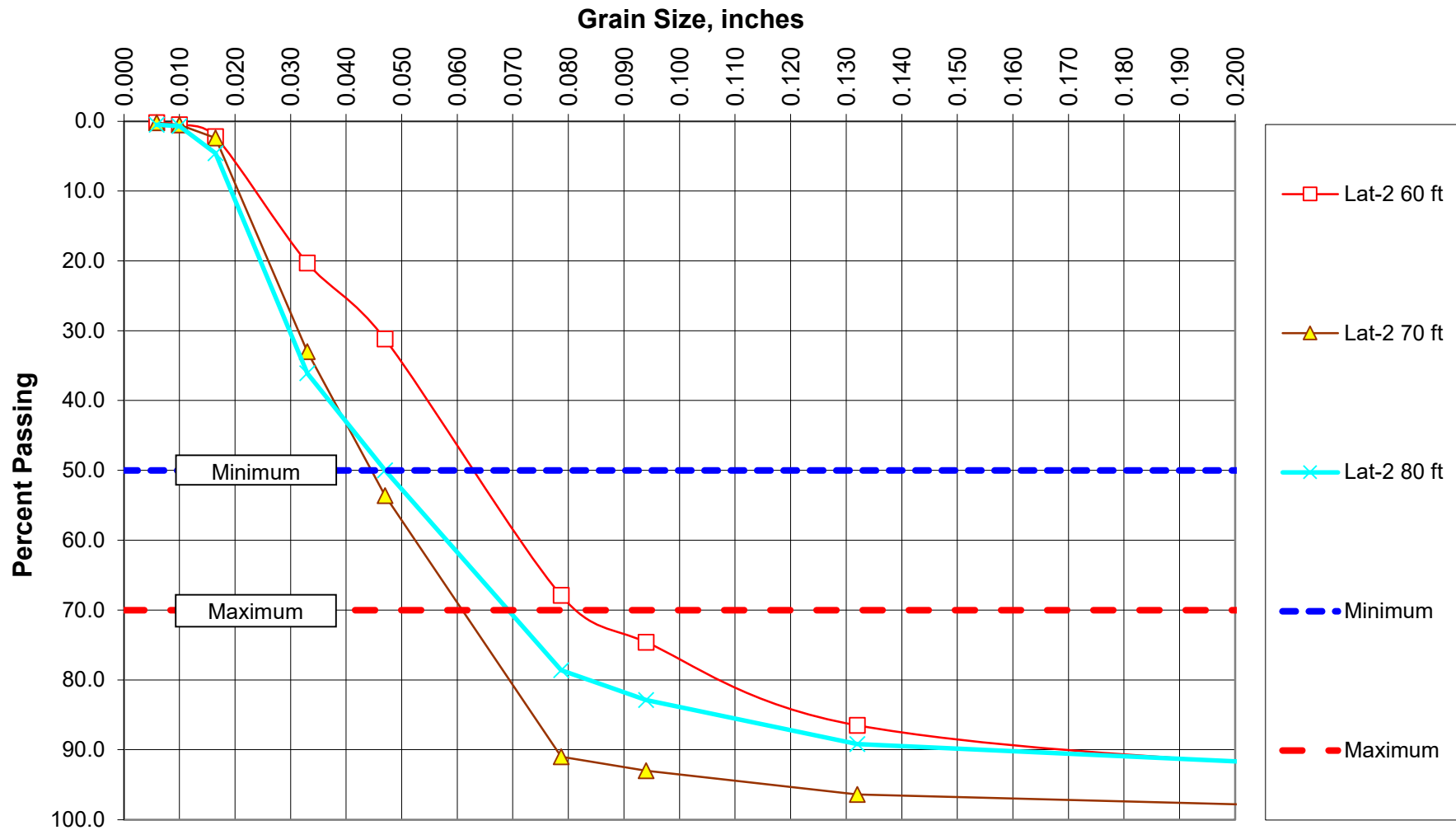
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	80	slot
20-30	80	slot
30-40	100	slot
40-50	80	slot
50-60	60	slot
60-70	80	slot
70-80	100	slot
80-90	125	slot
90-100	150	slot
100-110	150	slot
110-120	150	slot
120-130	125	slot
130-140	100	slot
140-150	100	slot
150-160	100	slot
160-170	80	slot
170-180	60	slot
180-190	50	slot
190-200	50	slot
200-210	50	slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	3	30
60	2	20
80	5	50
100	5	50
125	2	20
150	3	30
Total	21	210

Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 2



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 2



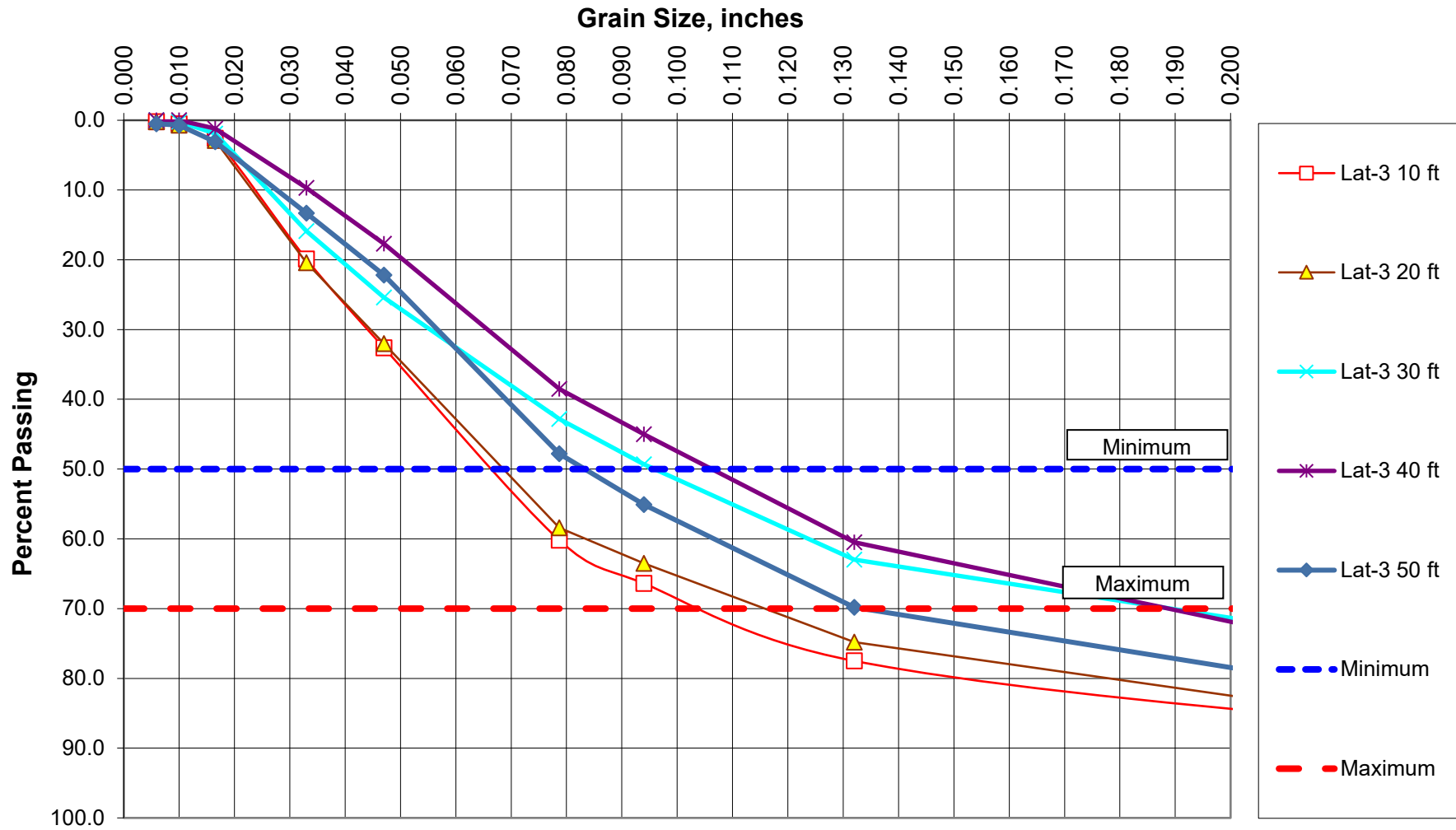
Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	2	
Lateral Length:	80	feet
Screen Length:	70	feet
Date Completed:	12/3/2021	

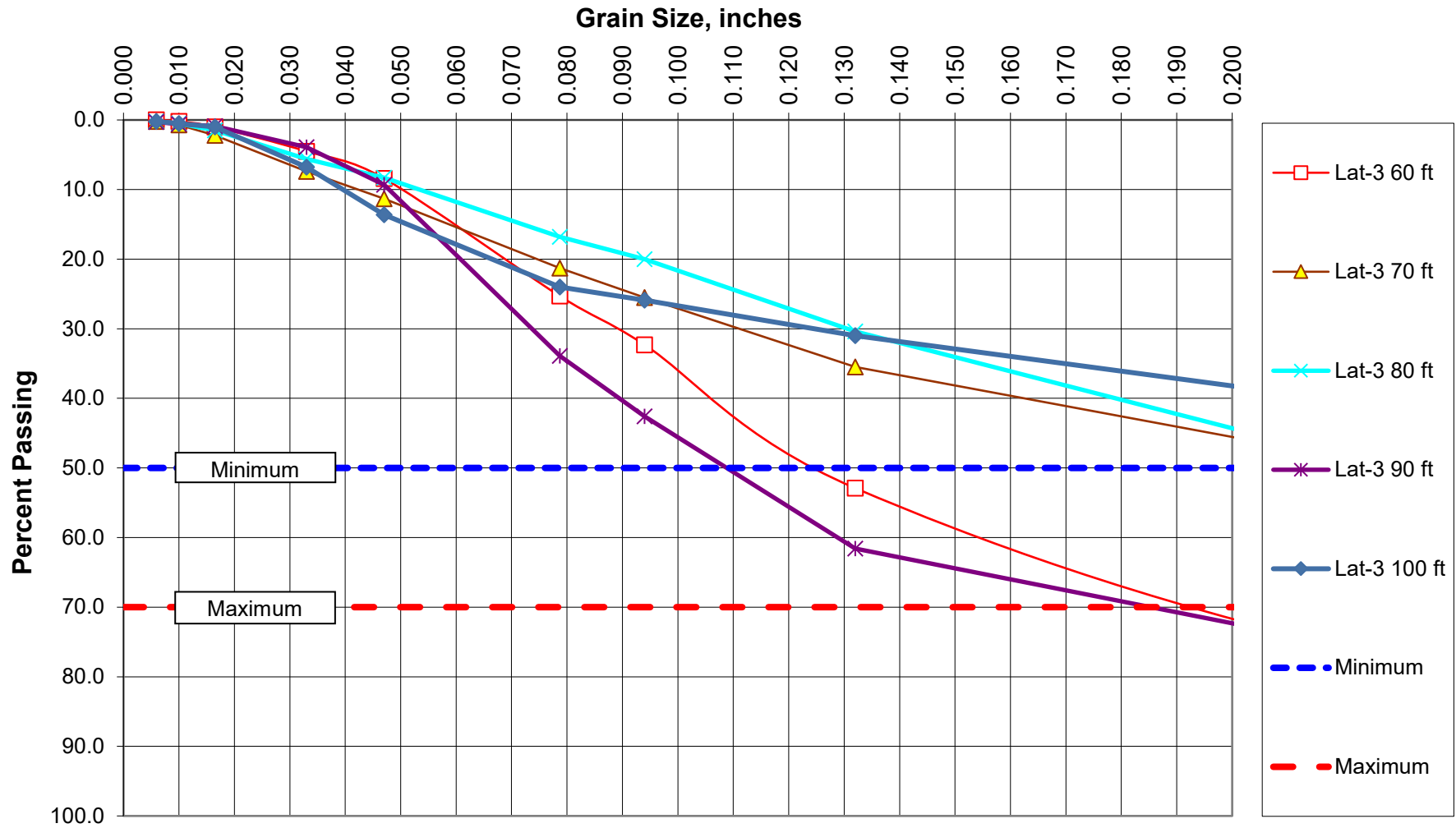
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	80	slot
20-30	80	slot
30-40	100	slot
40-50	100	slot
50-60	60	slot
60-70	60	slot
70-80	50	slot
80-90		slot
90-100		slot
100-110		slot
110-120		slot
120-130		slot
130-140		slot
140-150		slot
150-160		slot
160-170		slot
170-180		slot
180-190		slot
190-200		slot
200-210		slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	1	10
60	2	20
80	2	20
100	2	20
125	0	0
150	0	0
Total	8	80

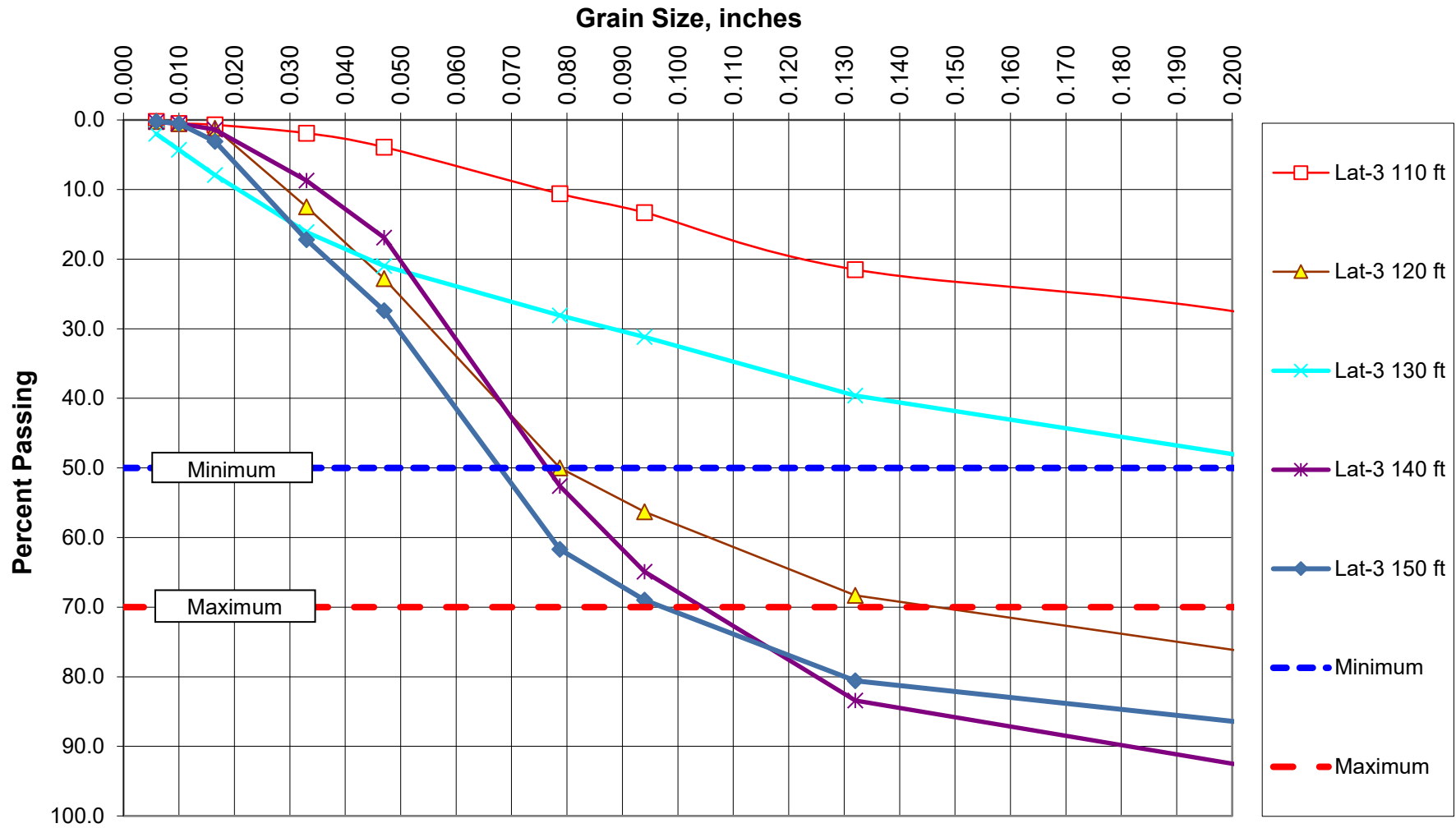
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3



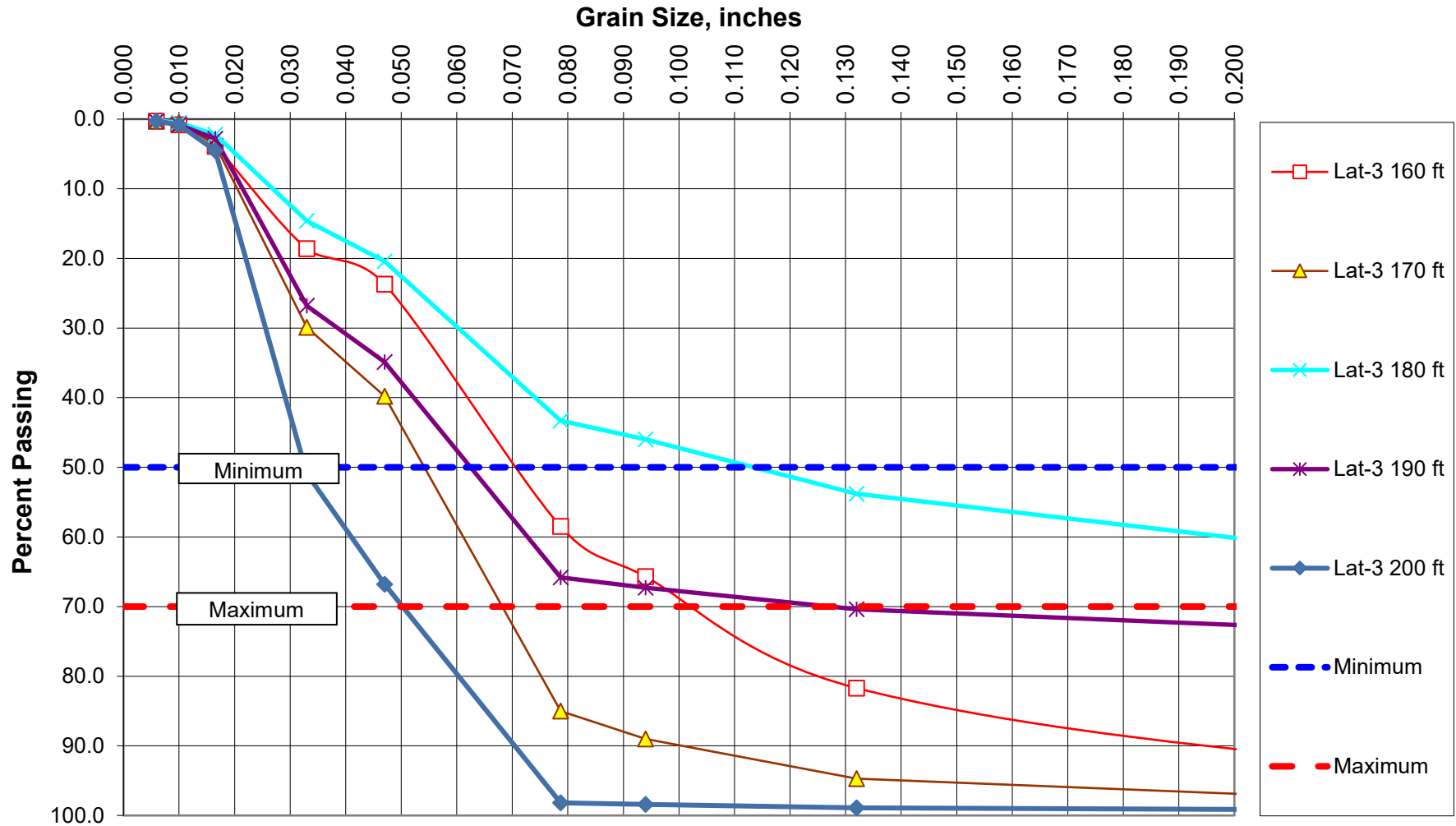
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3



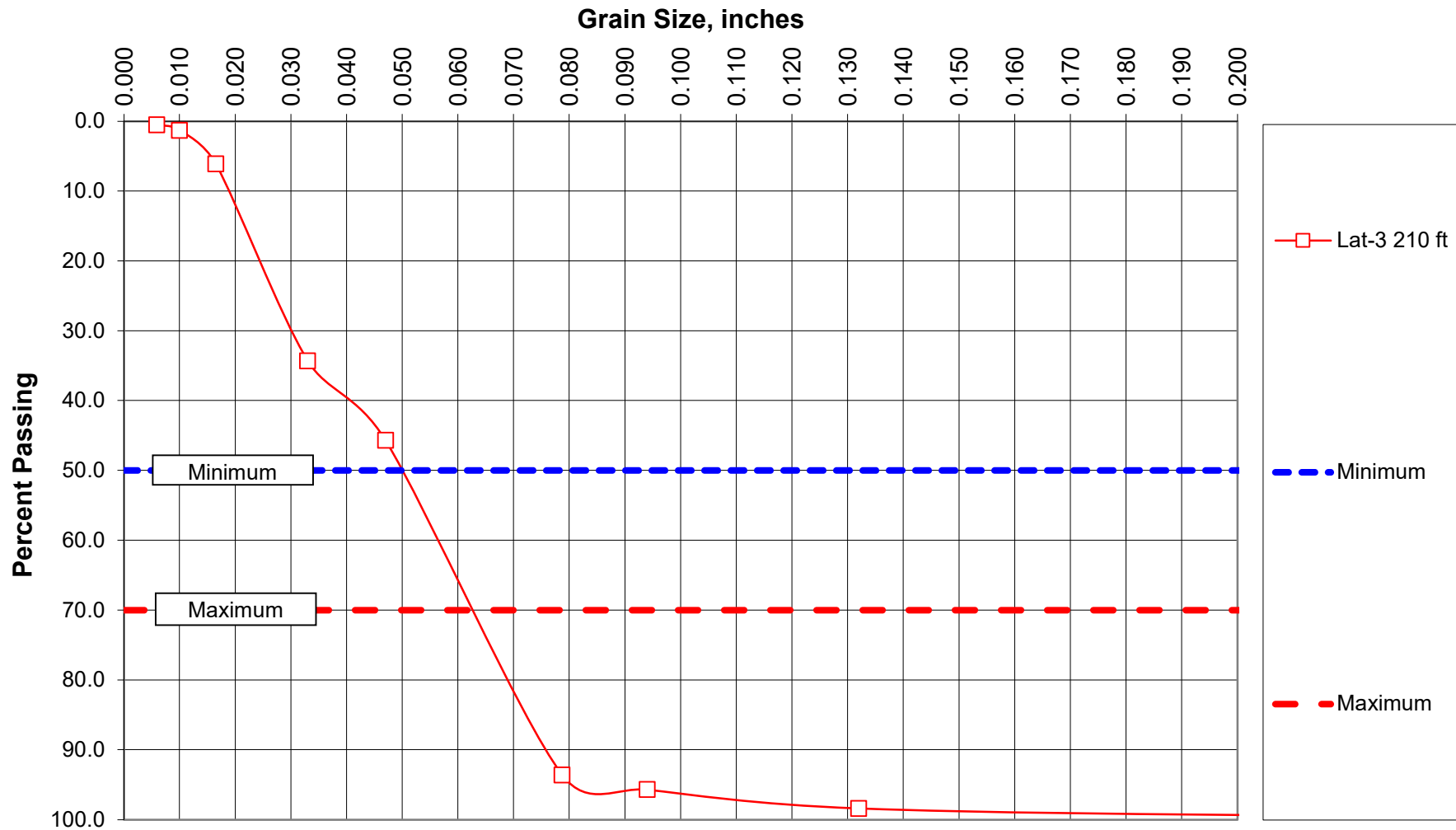
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3



Grain Size Analyses
Sioux Falls, SD
Well 72
Lateral 3



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 3



Collector Well

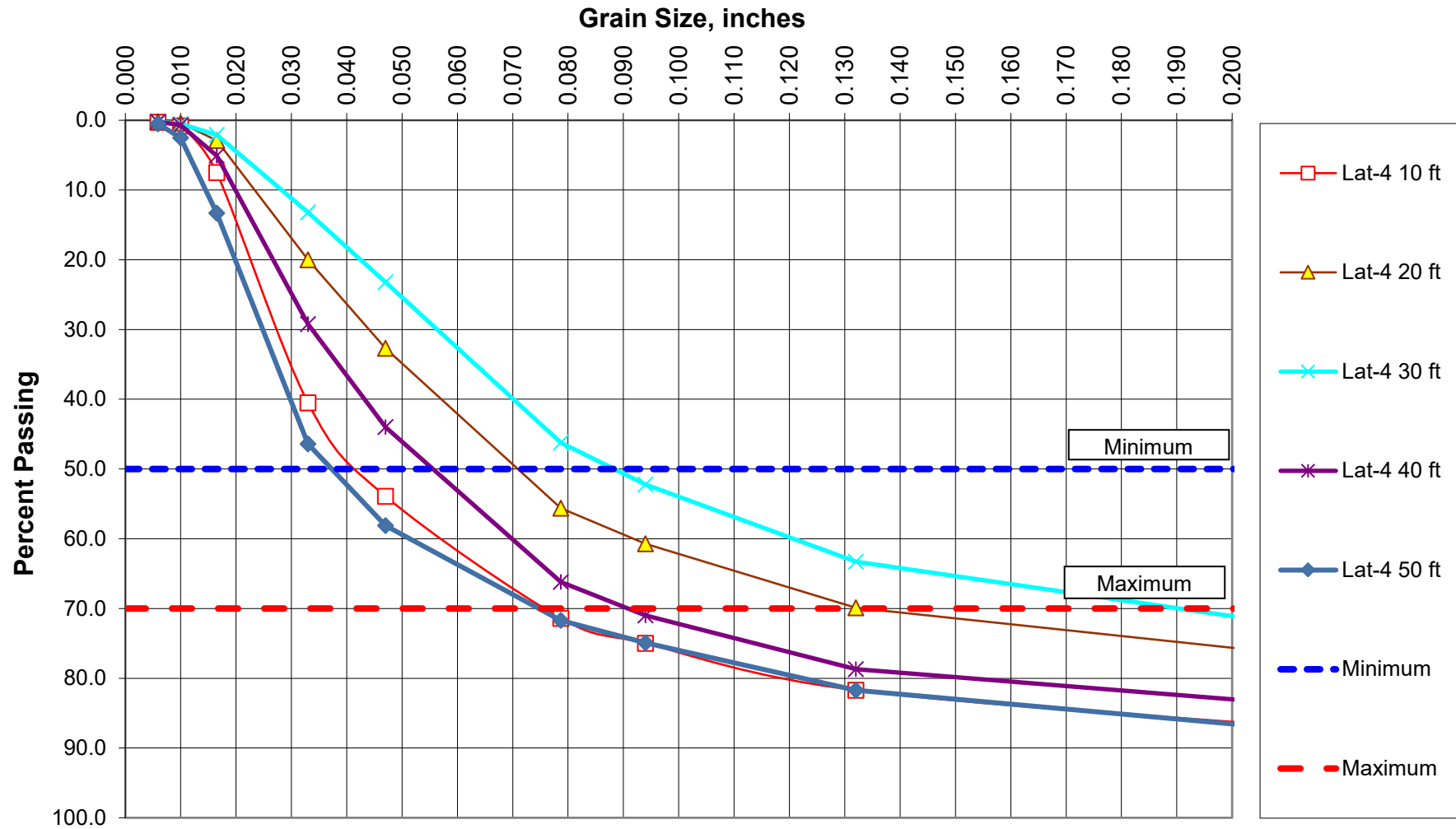
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD
Well ID:	Collector Well 72
Lateral Number:	3
Lateral Length:	feet
Screen Length:	feet
Date Completed:	12/9/2021

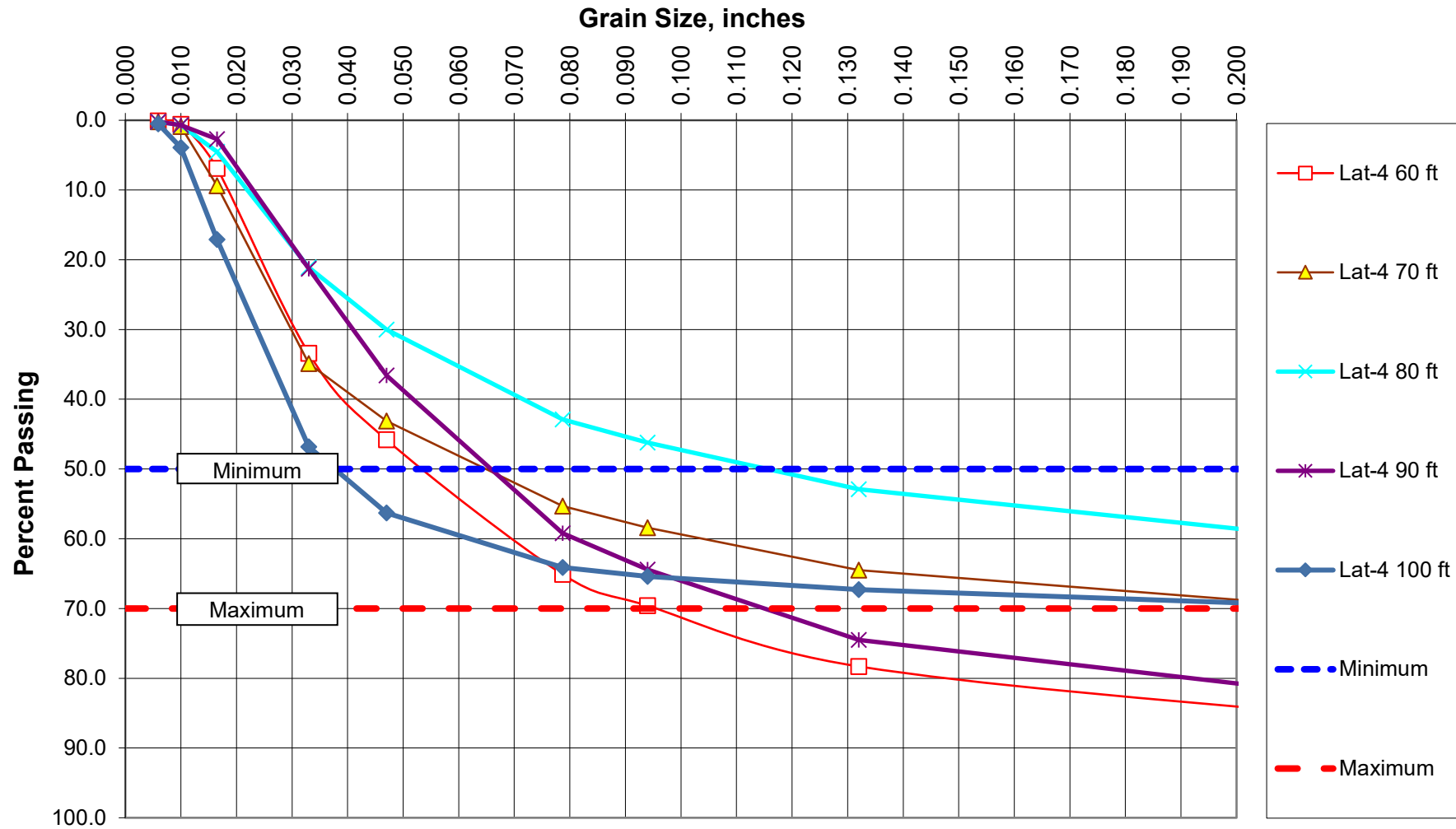
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	60	slot
20-30	80	slot
30-40	100	slot
40-50	125	slot
50-60	100	slot
60-70	125	slot
70-80	150	slot
80-90	150	slot
90-100	125	slot
100-110	150	slot
110-120	125	slot
120-130	100	slot
130-140	80	slot
140-150	80	slot
150-160	60	slot
160-170	60	slot
170-180	50	slot
180-190	60	slot
190-200	50	slot
200-210	30	slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	1	10
40	0	0
50	2	20
60	4	40
80	3	30
100	3	30
125	4	40
150	3	30
Total	21	210

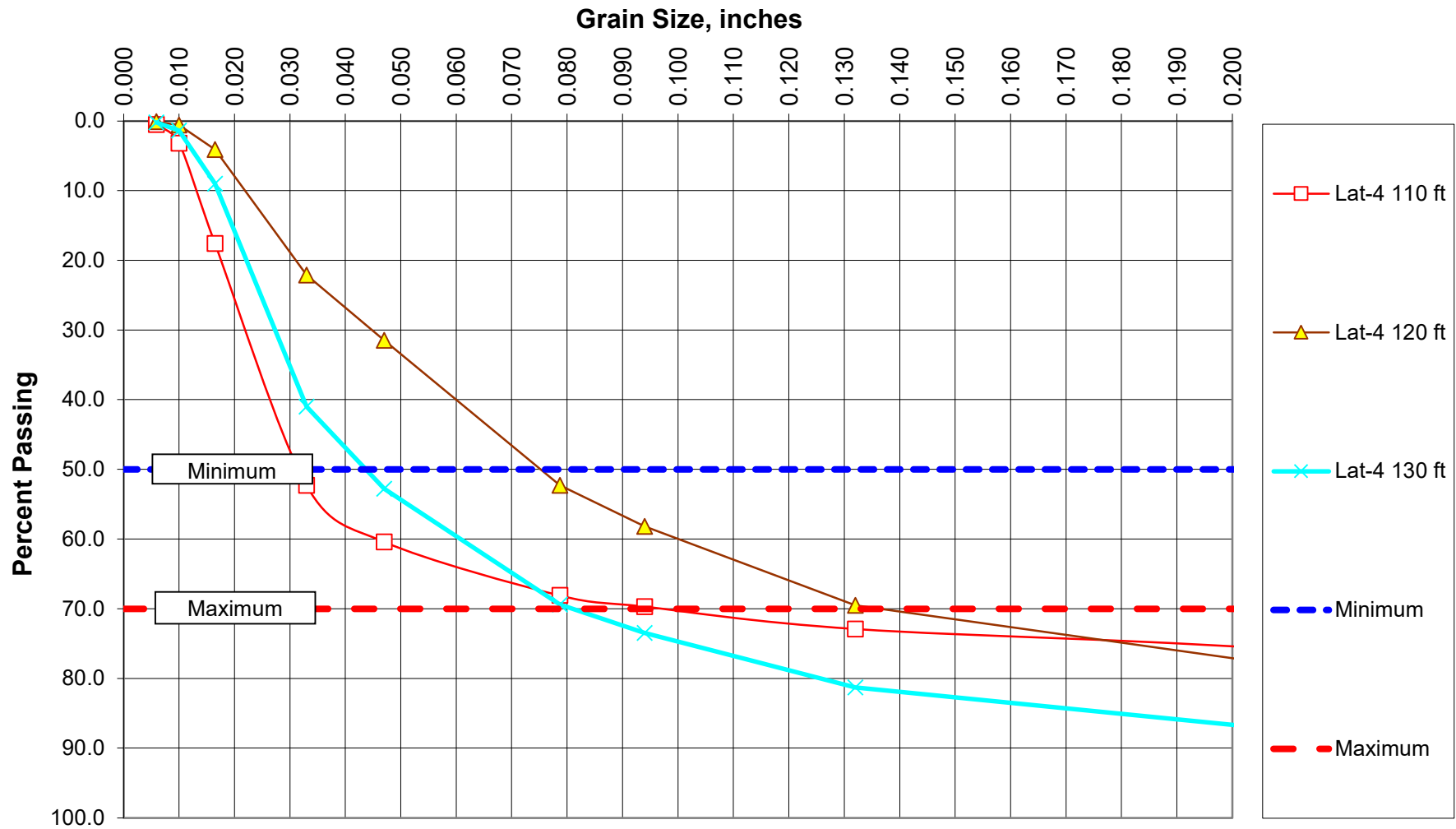
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 4



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 4



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 4



Collector Well

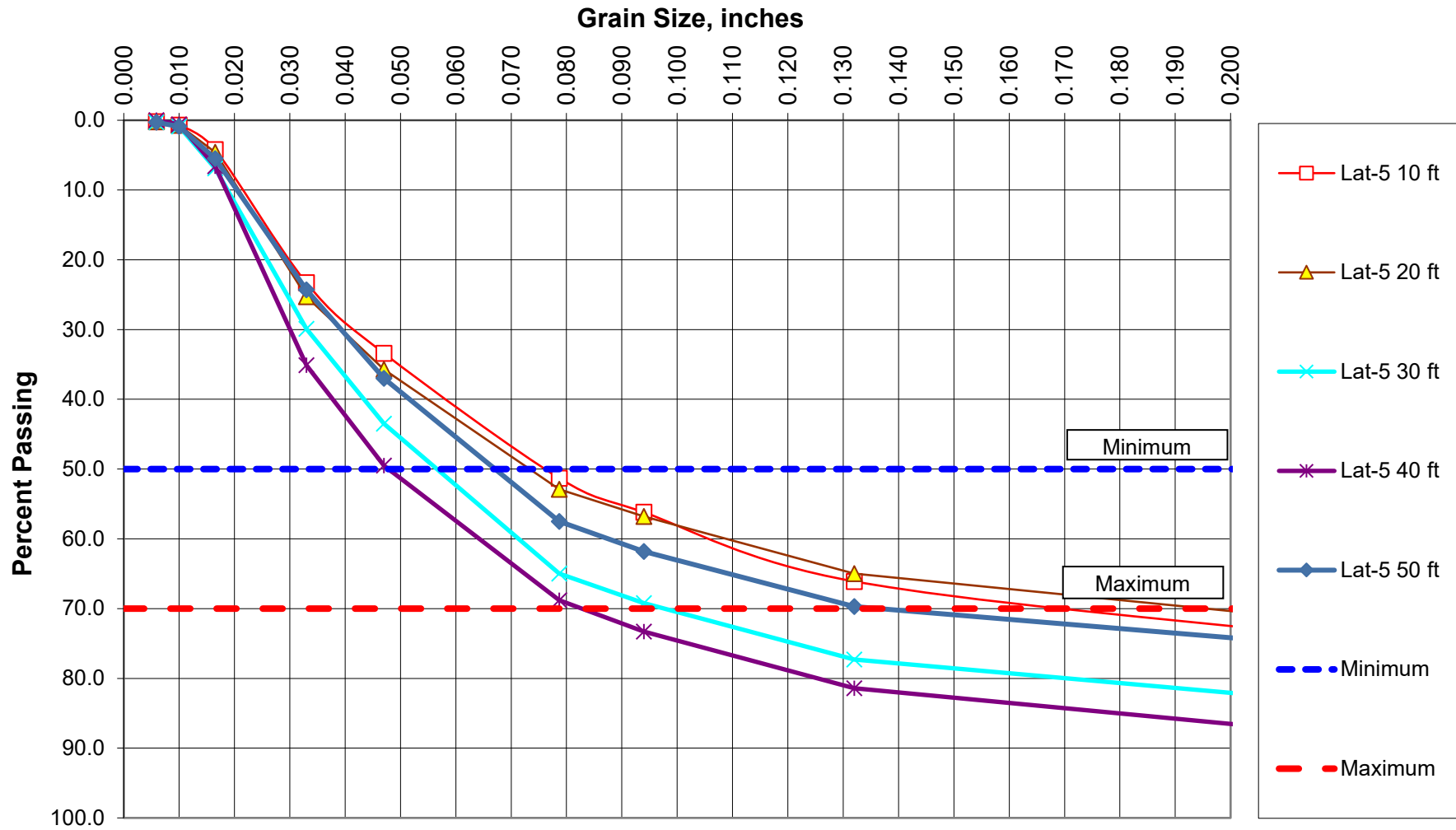
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	4	
Lateral Length:	130	feet
Screen Length:	120	feet
Date Completed:	1/5/2022	

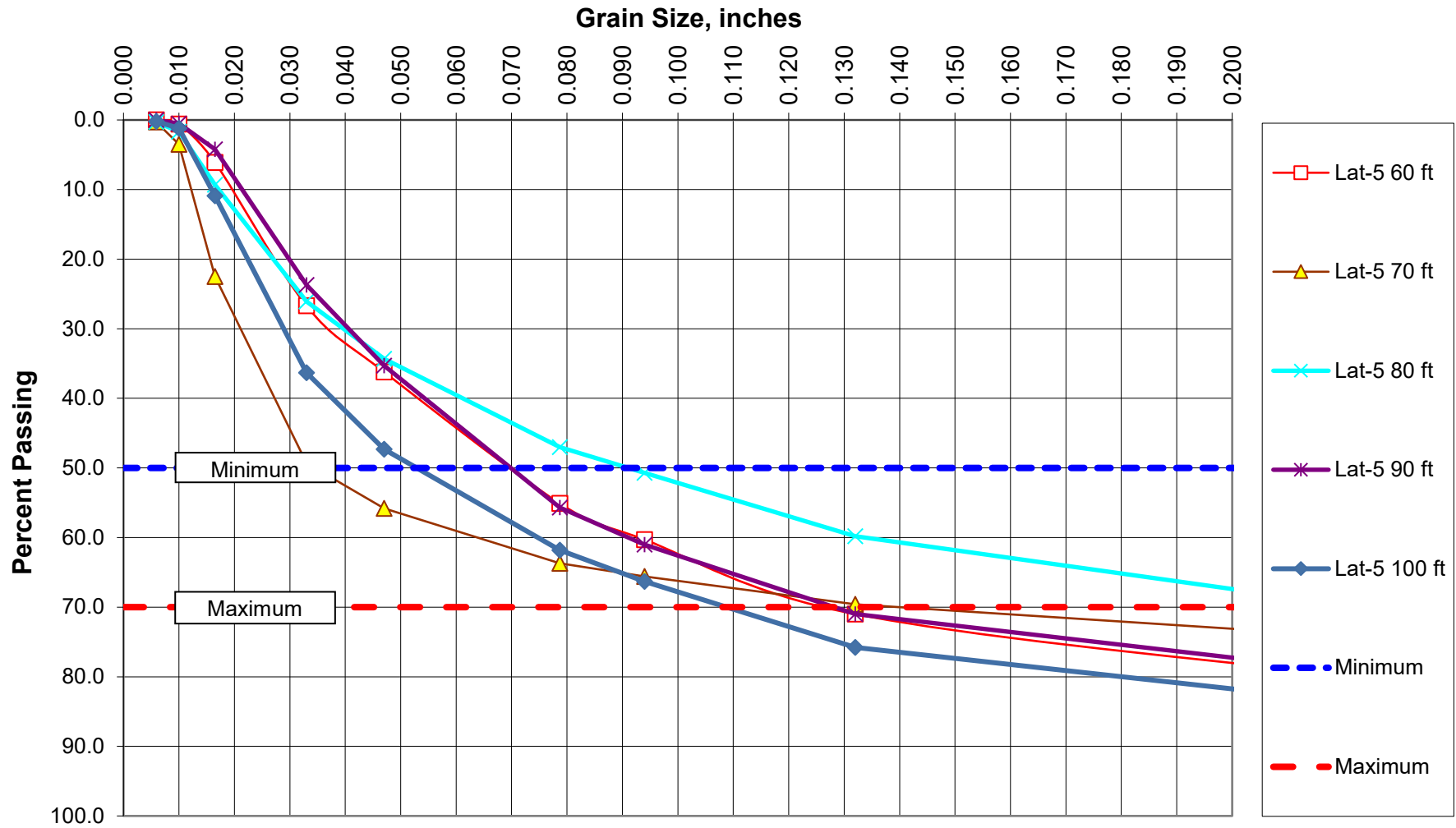
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	50	slot
20-30	80	slot
30-40	100	slot
40-50	60	slot
50-60	50	slot
60-70	60	slot
70-80	100	slot
80-90	125	slot
90-100	100	slot
100-110	80	slot
110-120	60	slot
120-130	60	slot
130-140		slot
140-150		slot
150-160		slot
160-170		slot
170-180		slot
180-190		slot
190-200		slot
200-210		slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	2	20
60	4	40
80	2	20
100	3	30
125	1	10
150	0	0
Total	13	130

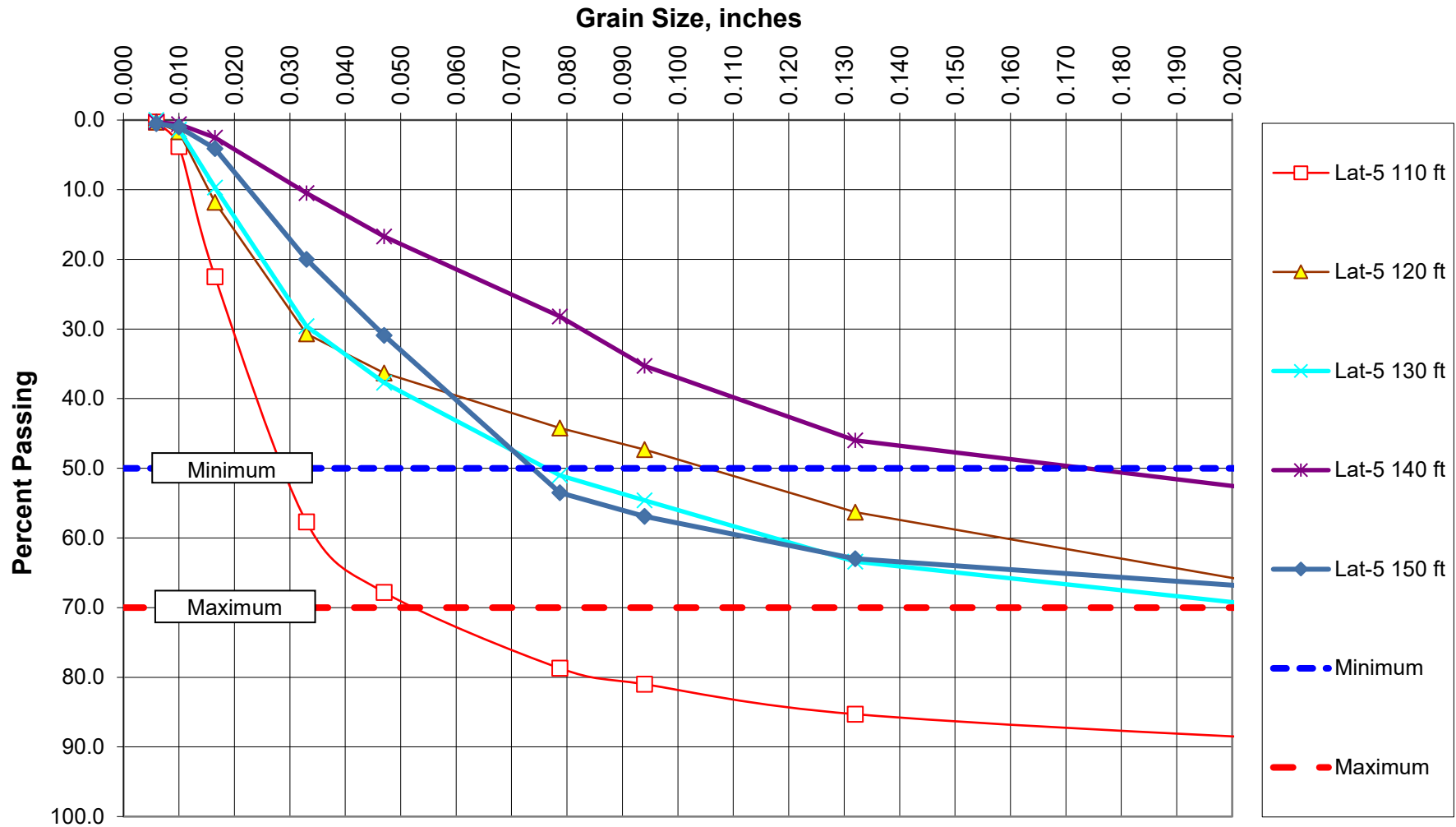
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5



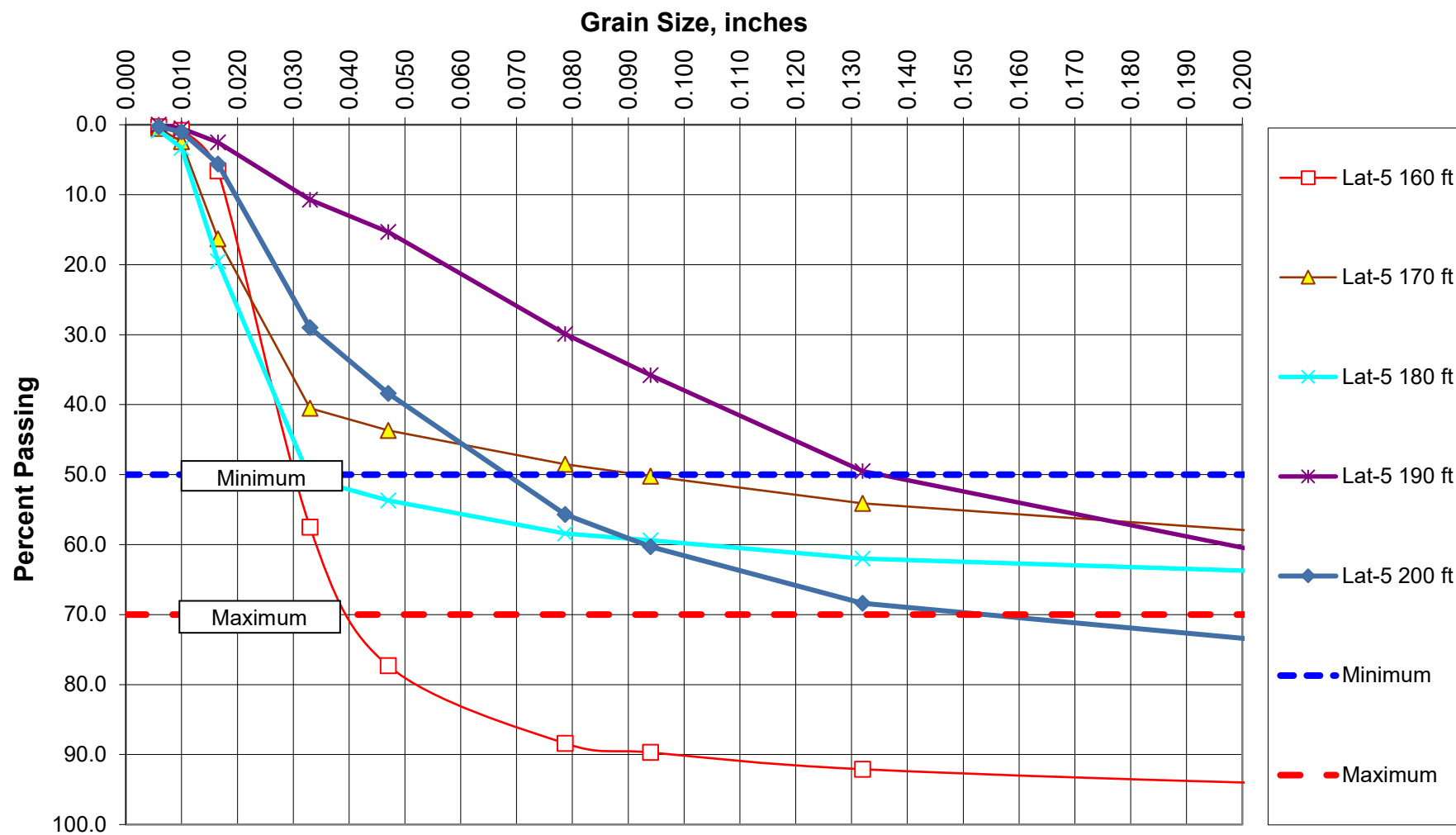
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5



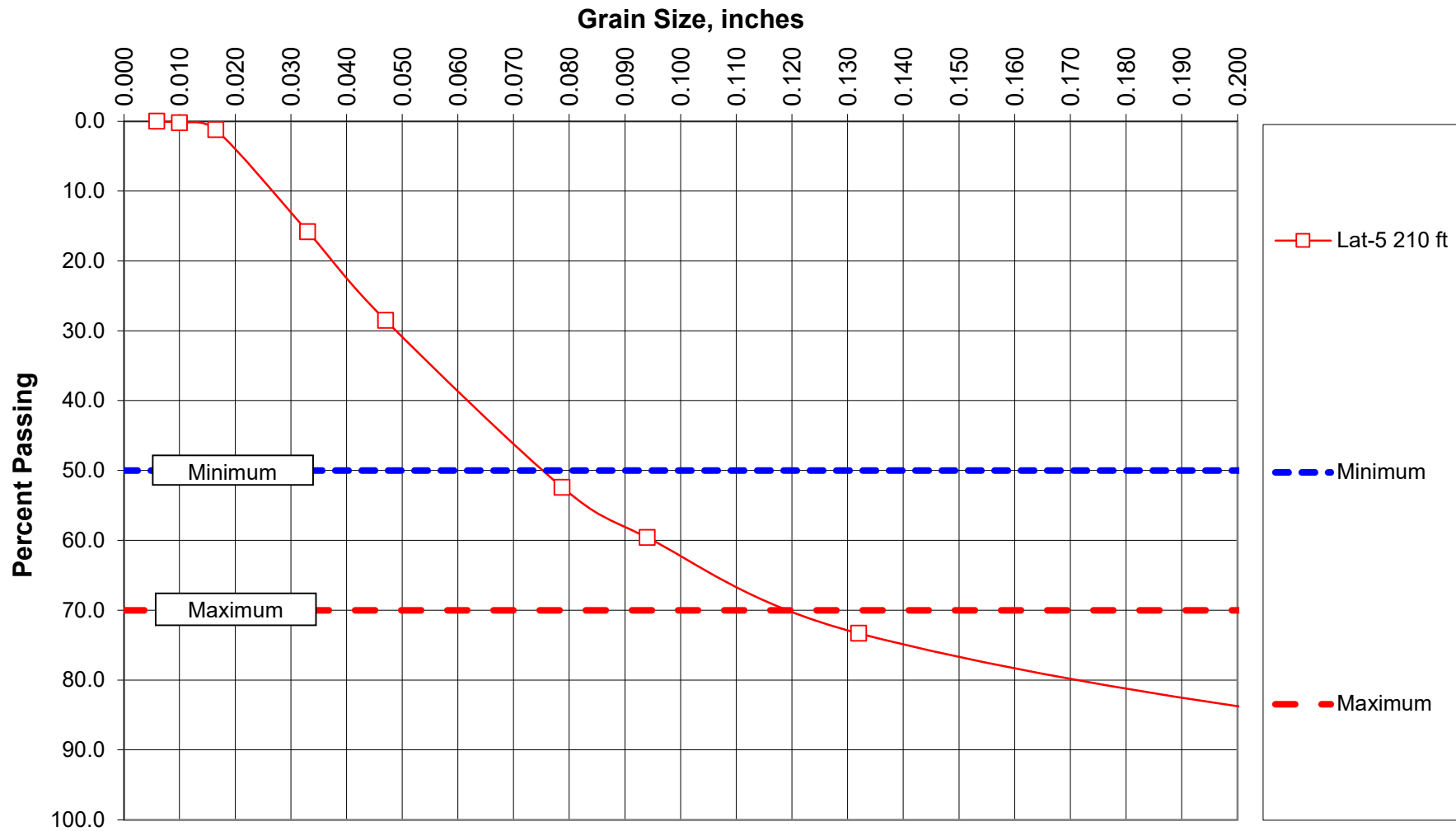
Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 5



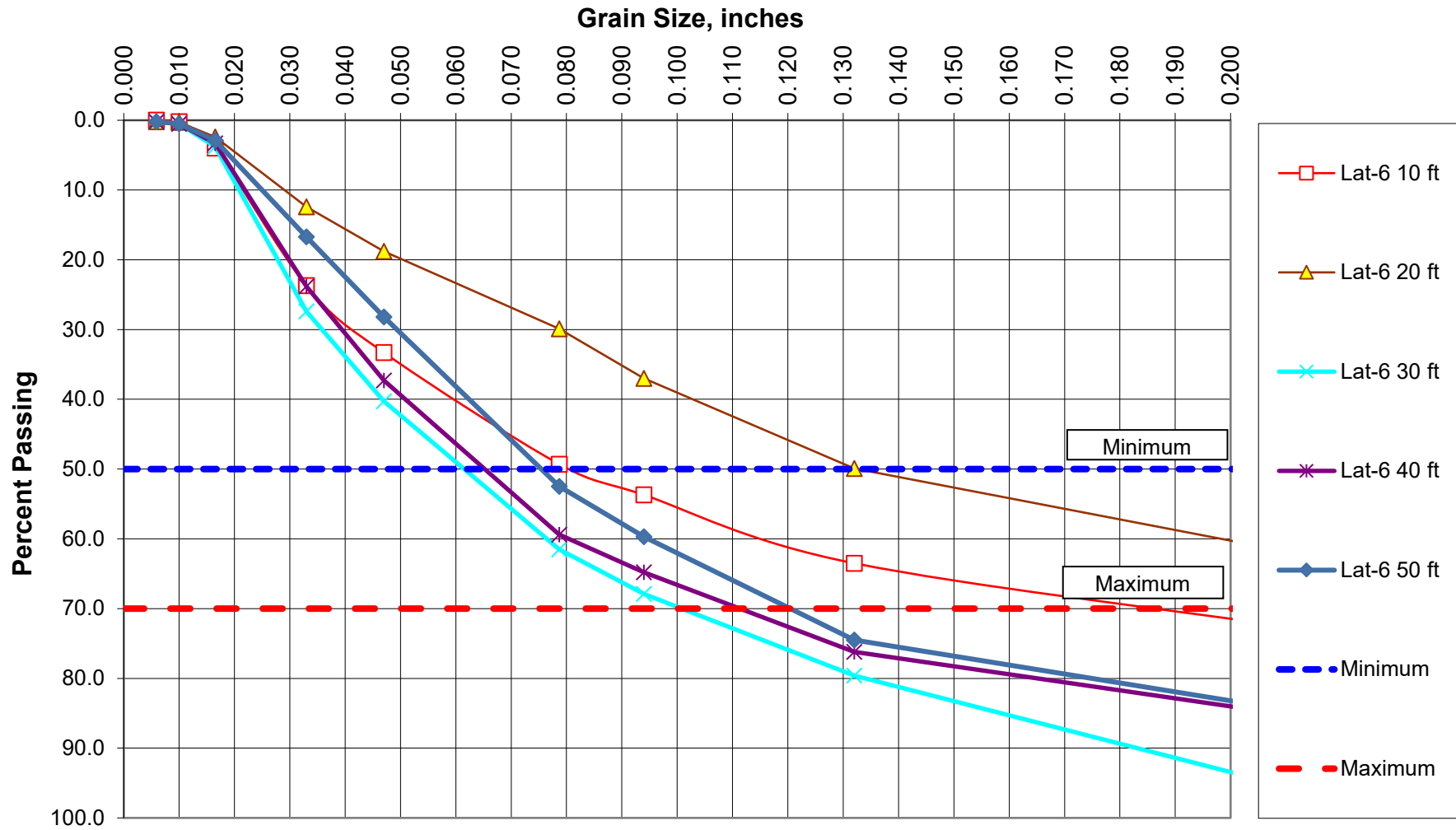
Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	5	
Lateral Length:	210	feet
Screen Length:	200	feet
Date Completed:	1/13/2022	

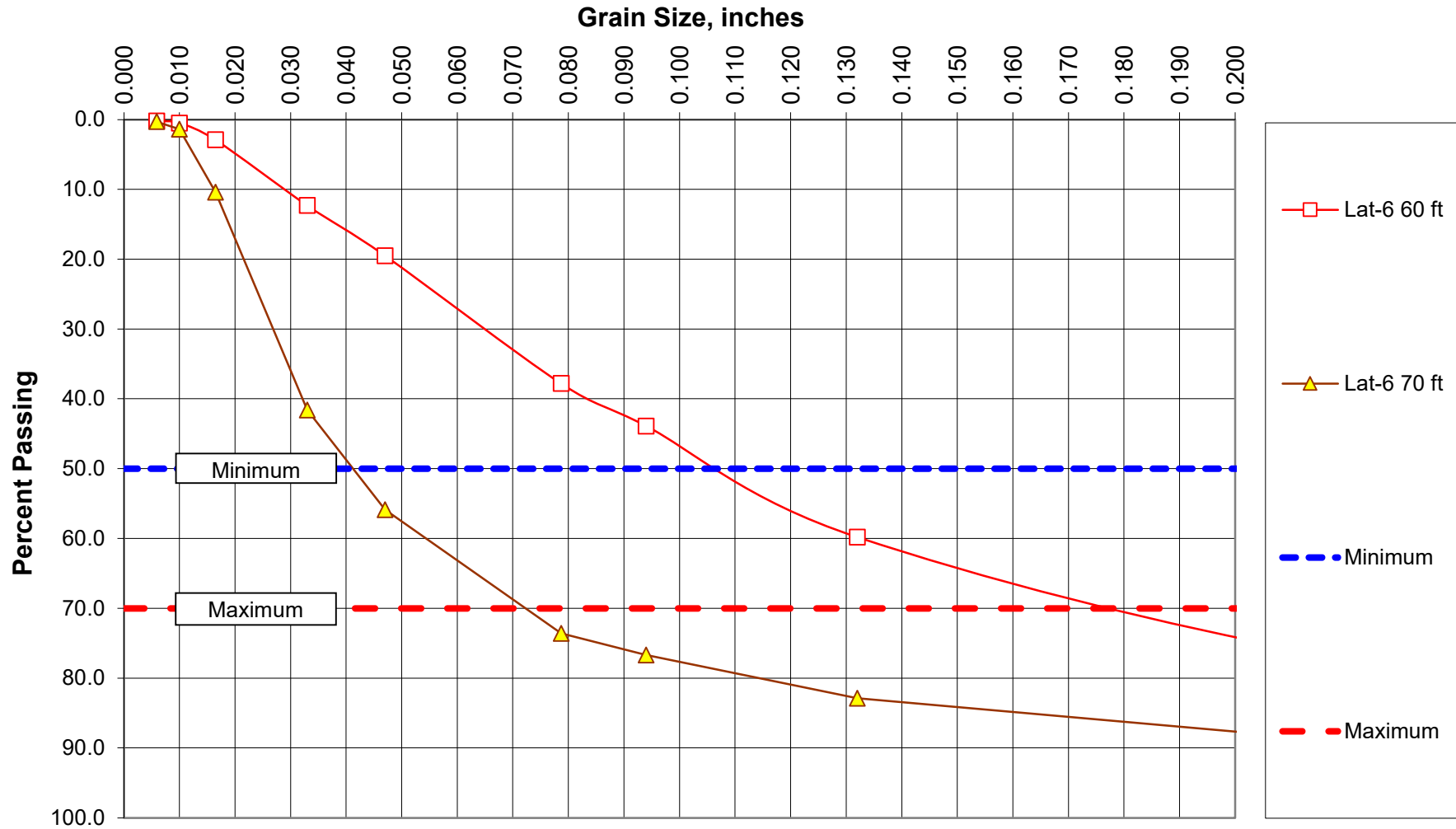
Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	100	slot
20-30	80	slot
30-40	60	slot
40-50	60	slot
50-60	80	slot
60-70	80	slot
70-80	60	slot
80-90	100	slot
90-100	80	slot
100-110	60	slot
110-120	40	slot
120-130	80	slot
130-140	120	slot
140-150	120	slot
150-160	80	slot
160-170	30	slot
170-180	80	slot
180-190	120	slot
190-200	120	slot
200-210	120	slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	1	10
40	1	10
50	0	0
60	4	40
80	7	70
100	2	20
120	5	50
150	0	0
Total	21	210

Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 6



Grain Size Analyses
Sioux Falls, SD
Collector Well 72
Lateral 6

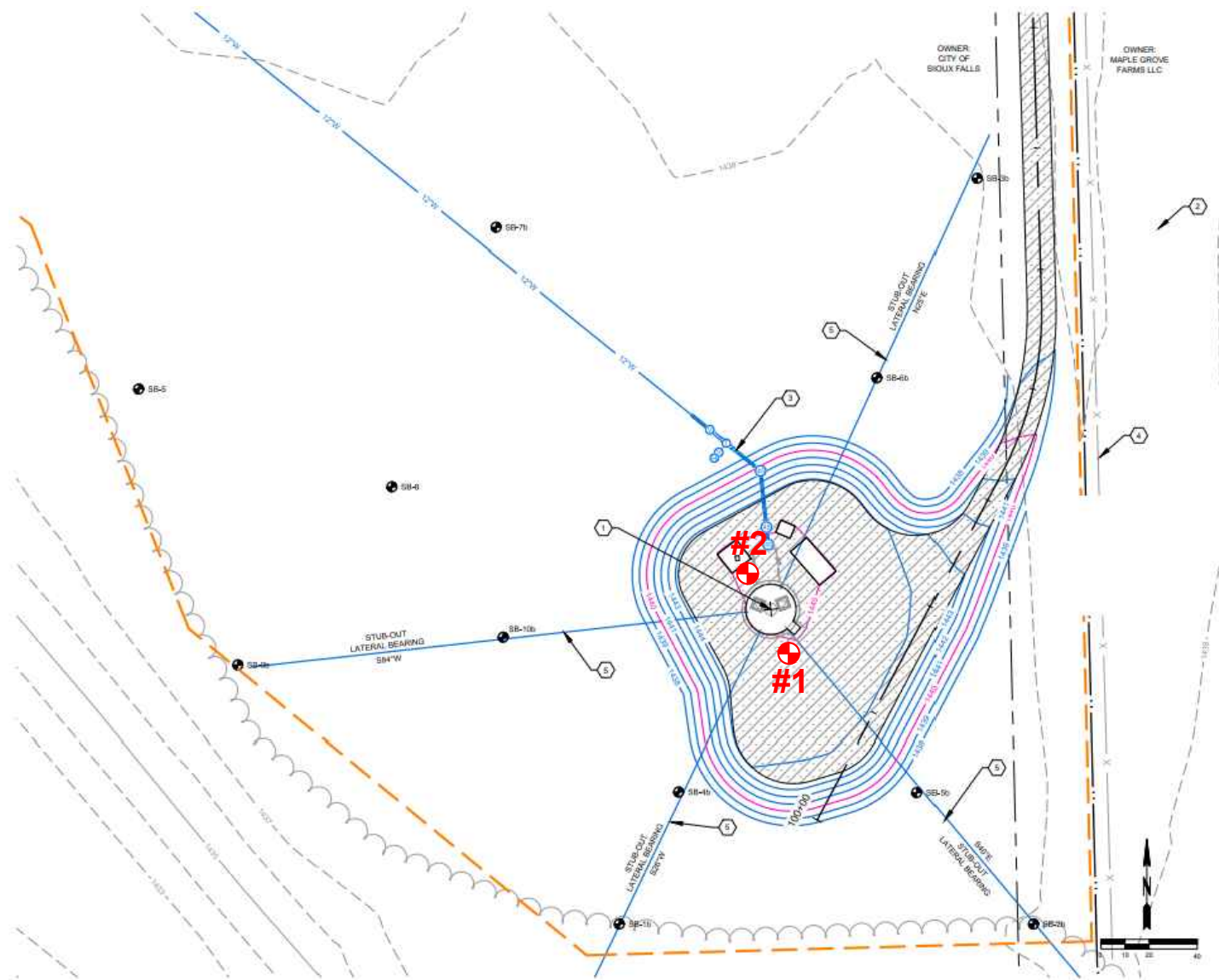


Collector Well
Recommended Screen Slot Distribution

Client:	Sioux Falls, SD	
Well ID:	Collector Well 72	
Lateral Number:	6	
Lateral Length:	70	feet
Screen Length:	60	feet
Date Completed:	1/18/2022	

Screen slot distribution		
Distance from Inside Wall of Caisson (feet)	Screen Slot Size (1000 ^{ths} inch)	
0-10	Blank	
10-20	100	slot
20-30	125	slot
30-40	80	slot
40-50	80	slot
50-60	100	slot
60-70	60	slot
70-80		slot
80-90		slot
90-100		slot
100-110		slot
110-120		slot
120-130		slot
130-140		slot
140-150		slot
150-160		slot
160-170		slot
170-180		slot
180-190		slot
190-200		slot
200-210		slot

Screen Size Utilization		
Screen Slot Size (1000 ^{ths} inch)	Number of 10-foot Section	Length per Slot Size (feet)
Blank	1	10
20	0	0
30	0	0
40	0	0
50	0	0
60	1	10
80	2	20
100	2	20
125	1	10
150	0	0
Total	7	70



-BORING LOCATION



**AMERICAN
ENGINEERING
TESTING, INC.**

PROJECT: SUBSURFACE EXPLORATION -
PROPOSED COLLECTOR WELL 72
SIOUX FALLS, SOUTH DAKOTA

SUBJECT: BORING LOCATION MAP

SCALE: NONE

PROJECT NO.

P-0004044

DATE: 07/12/2021

DRAWN BY: ZLH

REVIEWED BY: BWC



AMERICAN
ENGINEERING
TESTING, INC.

SUBSURFACE BORING LOG

AET No: **P-0004044** Log of Boring No. **1 (p. 1 of 1)**
Project: **Collector Well 72; Sioux Falls, South Dakota**

DEPTH IN FEET	Surface Elevation 1442.2' MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	qu
1	FILL, mixture of ORGANIC FAT CLAY and FAT CLAY, black and very dark brown, moist	FILL									
2											
3											
4											
5	FAT CLAY, brownish gray, moist to very moist, firm (CL/CH)	FINE ALLUVIUM	11	M	SS	12					
6											
7											
8			8	M	SS	1					
9	CLAYEY SAND, fine to medium grained, brown, very moist, loose (SC)	MIXED ALLUVIUM									
10											
11			6	▼	SS	16					
12											
13	SAND, fine to medium grained, with gravel, brown, moist to wet to 12.5' then waterbearing, medium dense to loose (SP)	COARSE ALLUVIUM	16	W	SS	14					
14											
15											
16			21	W	SS	12					
17											
18											
19											
20											
21			6	W	SS	10					
22											
23											
24											
25											
26			24	W	SS	14					
27	SAND, fine to medium grained, with gravel, gray, waterbearing, medium dense to dense to medium dense to dense, cobbles at 47' (SP)										
28											
29											
30											
31											
32											
33											
34											
35			14	W	SS	12					
36											
37											
38											
39											
40			49	W	SS	14					
41											
42											
43											
44											
45											
46			44	W	SS	18					
47	SANDY LEAN CLAY, with a little gravel, gray, moist, stiff (CL)	TILL									
48											
49											
50											
51	END OF BORING		14	M	SS	18					3200

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA								
14½'-49½'	RD w/DM	7/6/21	12:35	16'	14.5'	16'		12.5'	
BORING COMPLETED: 7/6/21									
DR: MH LG: JD Rig: 63									

AET CORP P-0004044.GPJ AET-CPT-WELL_20181012_JG.GDT 7/13/21



AMERICAN
ENGINEERING
TESTING, INC.

SUBSURFACE BORING LOG

AET No: **P-0004044** Log of Boring No. **2 (p. 1 of 1)**
Project: **Collector Well 72; Sioux Falls, South Dakota**

DEPTH IN FEET	Surface Elevation 1442.5' MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	qu	
1	FILL, mixture of ORGANIC FAT CLAY and FAT CLAY, black and very dark brown, moist											
2												
3												
4												
5	FAT CLAY, very dark brown, very moist, firm (CH) FAT CLAY, grayish brown, very moist, stiff to firm (CL/CH)											
6												
7												
8												
9	SAND, fine to medium grained, with gravel, brown, waterbearing, medium dense (SP)											
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29	SAND, fine to medium grained, with gravel, gray, waterbearing, medium dense to dense (SP)											
30												
31												
32												
33												
34												
35												
36												
37												
38												
39												
40												
41	SANDY LEAN CLAY, with a little gravel, gray, moist, very stiff, cobbles at 41.5' (CL)											
42												
43												
44												
45												
46												
47												
48												
49												
50												
51	END OF BORING											

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA								
14½'-49½'	RD w/DM	7/7/21	12:40	13.5'	12'	13.5'		10.5'	
BORING COMPLETED: 7/7/21									
DR: MH LG: JD Rig: 63									

AET CORP P-0004044.GPJ AET+CPT+WELL_20181012_JG.GDT 7/13/21



WELL 72 – FIELD PUMP INFORMATION

Vertical Turbine Pump

- Manufacturer: Flowserve
- Model: 14EMM – 3 Stage

Electric Motor

- 50 Hp
- Manufacturer: U.S. Motors
- Enclosure: WP-1

Static Water Level

- Soil Surface Elevation = 1,444.9 feet
- Static Water Elevation = 1,430.7 feet
- Depth of static water level from the soil surface = 14.2 feet