ATTACHMENT 4-
EL RIO SEDIMENTATION ANALYSIS-

Book 1 of 2-
El Rio Existing Condition Sedimentation Analysis

El Rio Watercourse Master Plan and Area Drainage Master Plan

Contract FCD 2001C024
Stantec Project No. 82000240

November 2005
Revised March 2006

Stantec

FINAL REPORT

El Rio Watercourse Master Plan

EL RIO SEDIMENTATION ANALYSIS

Book 1- El Rio Existing Condition Sedimentation Analysis

PREPARED FOR:

FLOOD CONTROL DISTRICT
of
Maricopa County

PREPARED BY:

STANTEC CONSULTING INC.
8211 South 48th Street
Phoenix, Arizona 85044
(602) 438-2200

March 2006

Contract FCD 2001C024

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17928
GEORGE V. SABOL
Date Signed 29 Mar 06
ARIZONA, U.S.A.

Registered Professional Engineer (Civil)
CERTIFICATE NO
33989
STEPHANIE R. GERLACH
Date Signed 03/29/2006
ARIZONA U.S.A.

Flood Control District of Maricopa County

Stantec

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Attachment 5 CD of Base HEC-6T Model

INTRODUCTION

PURPOSE

The sedimentation analyses of the portion of the Gila River from the confluence with the Agua Fria River to the State Route 85 Bridge (SR85 Bridge) are performed in support of the El Rio Watercourse Master Plan and Area Drainage Master Plan.

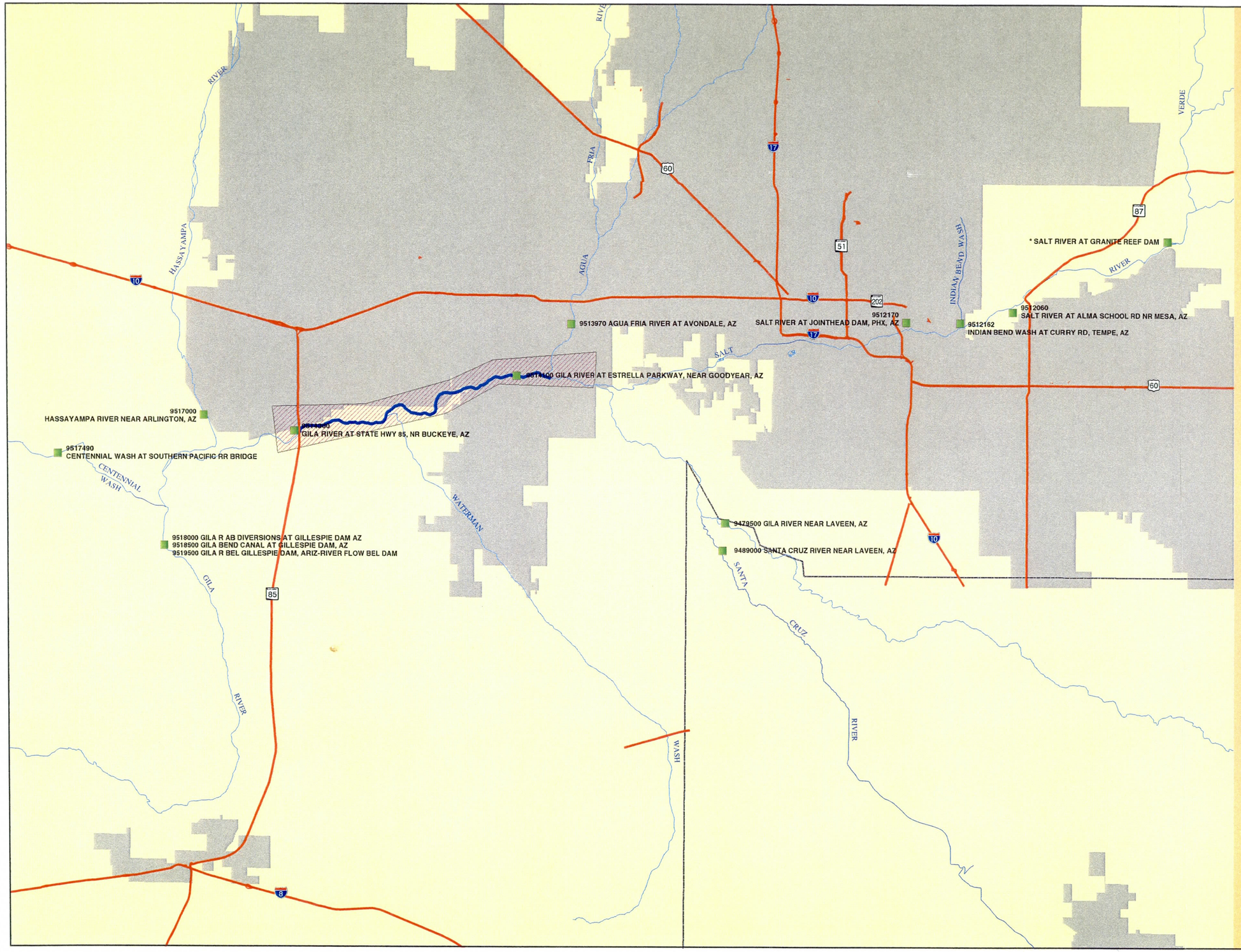
The sedimentation analyses are performed for the purpose of:

- Developing an understanding of the fluvial process of sedimentation within the El Rio project area for the period of record (from about 1921 through 2004) and for the 100-year flood.
- Developing an understanding of how the present river would respond with no intervention if subjected to a sequence of floods similar to those of historic record plus a 100-year flood.
- Qualitatively identifying tendencies for sedimentation that may occur in reaches of the study watercourse.
- Quantifying magnitudes of sedimentation that may occur.
- Providing a sediment transport model that can be used to evaluate various structural and nonstructural flood management alternatives.

Sedimentation embodies the processes of sediment transport, erosion (scour), deposition (fill), entrainment, and the compaction of sediment deposits (ASCE, 1975). For the purpose of this report, sedimentation is limited to the processes of sediment transport, erosion (local scour and riverbed degradation), and deposition, (local fill and riverbed aggradation). Where appropriate in this report, the specific sedimentation process being investigated or reported will be identified.

The sedimentation analysis is performed by use of the HEC-6T (MBH Software, Inc., 2002). To achieve the purposes of the analysis, numerous HEC-6T models were developed and evaluated. The results of the sedimentation analysis and an interpretation of the output of the final model, is presented.

The El Rio study area of the Gila River is from the confluence of the Agua Fria River to the SR 85 Bridge. The section between river mile 195.72 and river mile 186.87 is being analyzed by West Consultants, Inc. as part of the King Ranch/Cotton Lane Bridge Project. To avoid model boundary effects at the upstream and downstream study boundaries, the model limits extend from the confluence of the Salt River and Gila River at the upstream end (RS 199.07) which is 3.3 miles upstream of the confluence of the Agua Fria River, to 1.5 miles downstream of the SR 85 bridge (RS 178.61). The length of the Gila River that is modeled by HEC-6T is 18.6 miles. The model limits and study reach are shown in Figure 1.



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:

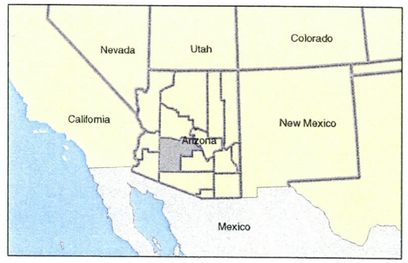
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

- USGS Gage Number and Name
- River
- El Rio Project Area
- HEC-6T Model Limits

N
W E
S

0 1 2 4 6 8
Miles



Notes:
* Denotes gage belonging to Salt River Project.

Title:

El Rio WCMP Study Area and HEC-6T Model Limits

Produced by:
BGS

Date:
7/21/2005

Figure:
1

HEC-6T MODEL VIEWER

HEC-6T produces copious output, which can be very informative in interpreting the results and, more importantly very useful in understanding the behavior of the river and the sedimentation process. The report, herein, presents a selected amount of model results as tables and figures in the text of the report. Additional output is provided in the attachments of the report. In addition, Stantec developed an HEC-6T Model Viewer that facilitates viewing large amounts of model output. The reader is encouraged to use the Model Viewer on the CD of Attachment 5. The information contained on the viewer will facilitate the use of the report results and aid in an overall understanding of the model results. Instructions for using the HEC-6T Model Viewer are contained in a READ.ME file on that CD.

AUTHORITY FOR STUDY

Pursuant to Arizona revised Statues 48-3609.01 the Flood Control District of Maricopa County (FCDMC) is authorized to conduct watercourse master plans for river reaches within Maricopa County. Stantec Consulting Inc. was awarded the contact (FCD 2001C024).

DATA COLLECTION

HYDRAULIC AND GEOMETRIC DATA

The majority of the hydraulic and geometric data in the HEC-6T model of the El Rio study area is taken from an existing study, *Salt-Gila River Floodplain Delineation Restudy,* by Michael Baker, Jr. Inc., dated May 1999 (Michael Baker Jr., Inc., 1999). A portion of the geometric data was obtained from the analysis of the Cotton Lane Bridge and King Ranch development as presented by West Consultants, Inc (2005).

SEDIMENT DATA

During September and October 2002 and January through March 2005, Stantec conducted field data collection of the El Rio study area. The following were performed:

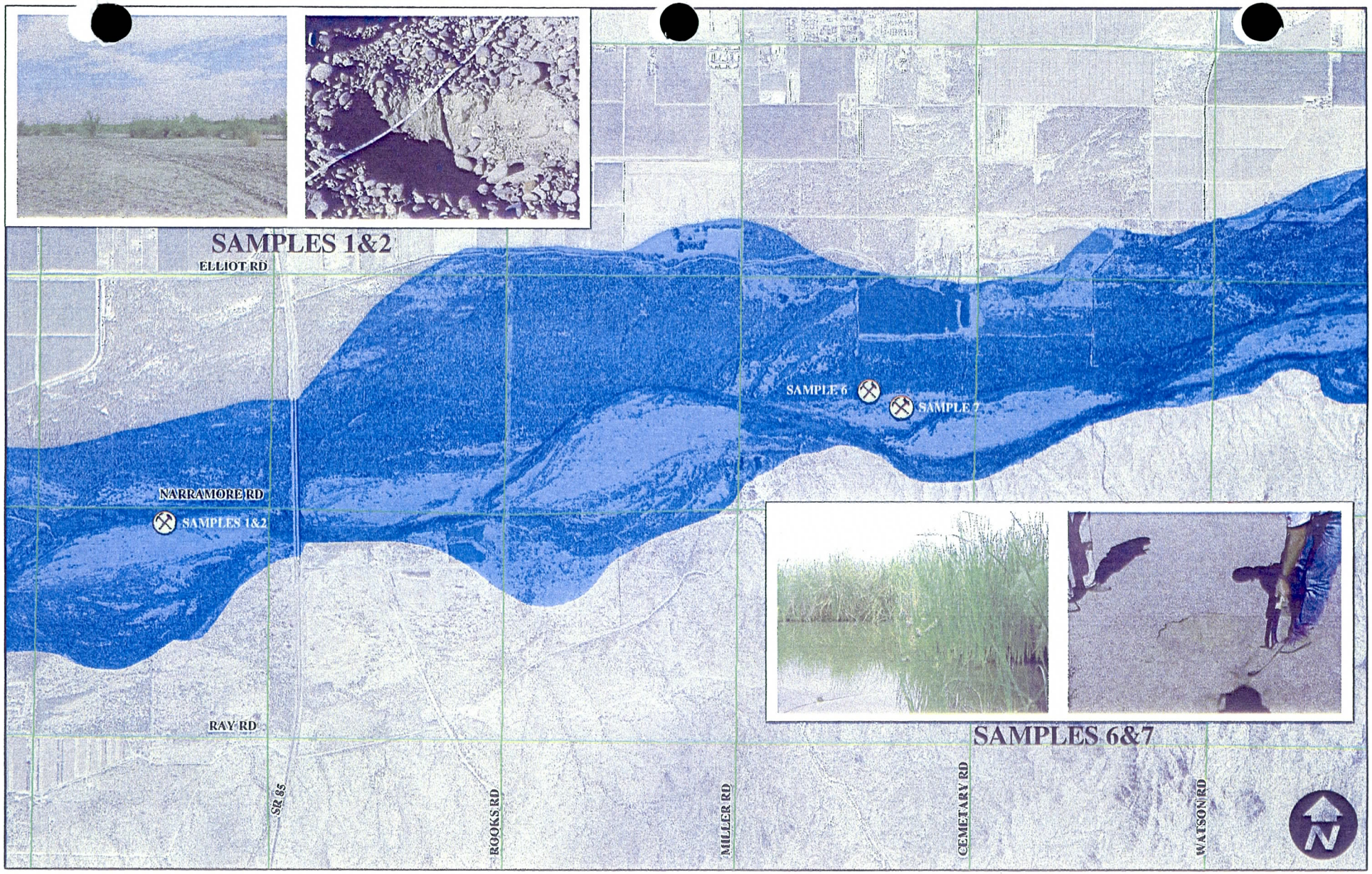
- Observation of physical features related to flow resistance (vegetation, bed roughness and channel alignment).
- Collection of sediment samples.
- Pebble count of bed material grain size.
- Excavation of shallow holes by shovel.
- Excavation of observation trenches by backhoe.
- Documentation of sediment characteristics by photographs.

Twelve sediment samples were obtained and size gradation laboratory analyses performed. The results of the gradation analyses are provided in Attachment 1. The size gradation data is presented graphically in the Model Development section.

Figure 2 shows the location of the sieve-analyzed samples of the bed material. All the samples except Sample 5 and Sample 6 were collected in the main channel of the Gila River. Sample 5 was collected in the main channel of Waterman Wash. Sample 6 was collected in the overbank of the Gila River.

One pebble count was conducted east of Jackrabbit Road in an area of coarse material. The pebble count data were collect by first laying a tape across the main channel. At each 10-foot interval, the sediment particle directly beneath the tape interval was measured. The pebble count data are provided in Attachment 1 and are shown graphically in the Model Development section.

Shallow holes, 2 to 3 feet deep, were dug by shovel at selected locations in the riverbed. Where the surface material was sand, excavation revealed sand also at depth. In certain areas, the bed of the river is covered by gravel and some cobble (Figure 3). Excavation in those areas showed that the surface was a veneer of gravel and cobble, one-grain thickness, underlain by mostly sand with small amounts of intermixed gravel (Figure 4).



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of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

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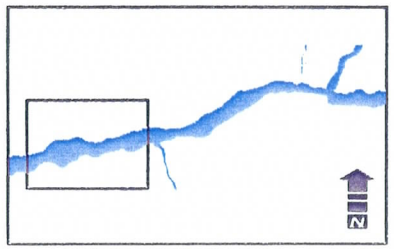
8211 S. 48th St.
Phoenix, AZ 85044

Sample Location

Floodway



EL RIO WATERCOURSE MASTER PLAN

FIGURE 2 - SEDIMENT SAMPLE LOCATIONS

SHEET 1 OF 3

15 SEPTEMBER 2005

0 1,500 3,000 6,000

1 Inch = 3000 Feet

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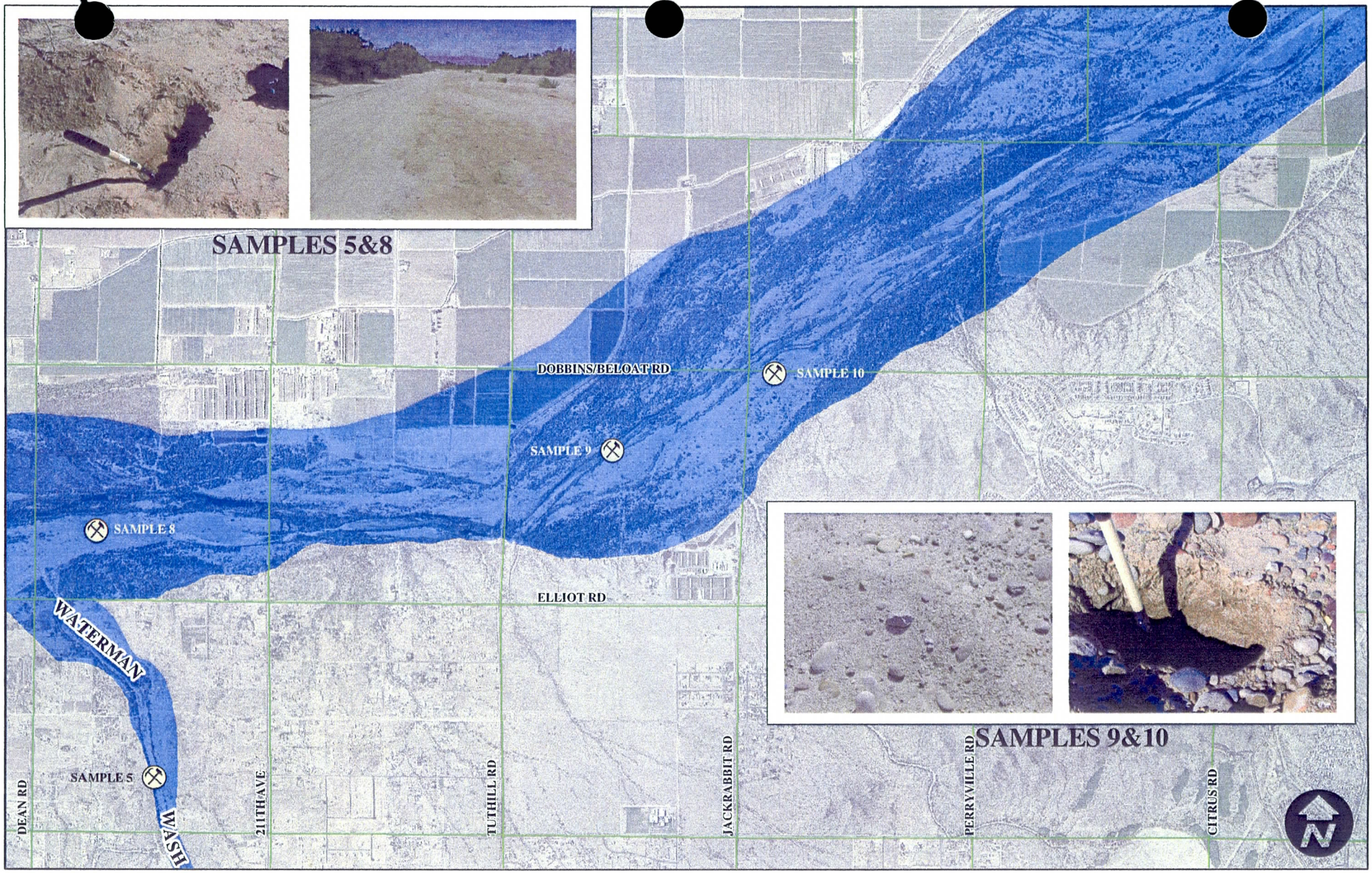

Flood Control District
of Maricopa County
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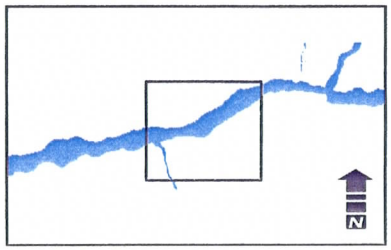
Floodway



EL RIO WATERCOURSE MASTER PLAN

FIGURE 2 - SEDIMENT SAMPLE LOCATIONS

SHEET 2 OF 3

15 SEPTEMBER 2005

0 1,500 3,000 6,000

1 Inch = 3000 Feet

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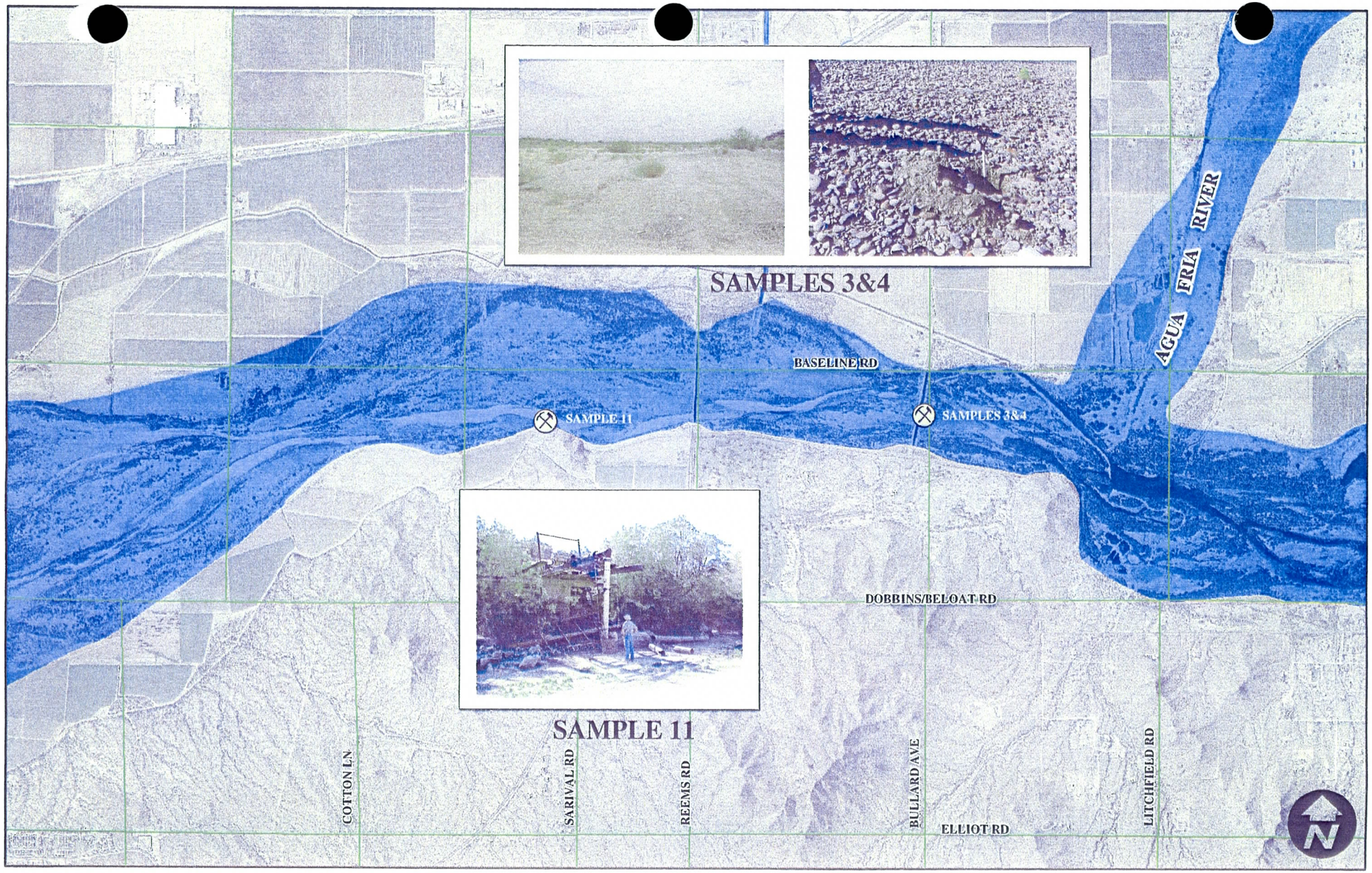

Flood Control District
of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

Stantec Consulting Inc.
8211 S. 48th St.
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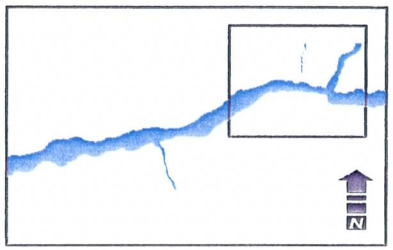
Sample Location

Floodway



EL RIO WATERCOURSE MASTER PLAN

FIGURE 2 - SEDIMENT SAMPLE LOCATIONS

SHEET 3 OF 3

15 SEPTEMBER 2005

0 1,500 3,000 6,000

1 Inch = 3000 Feet

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During March 2003 two trenches were dug in the floodplain upstream of State Route 85 and upstream of Miller Road, respectively. The material in the trenches down to groundwater consisted of clays, silts, and fine sands (Figure 5). The trench near State Route 85 was excavated near a Tamarisk tree. The root ball of the tree was approximately 2 feet below the ground surface, indicating an area of recent deposition (fill). One trench was dug in the main channel upstream of State Route 85. The material from the trench consisted of sand with some gravels and cobbles down to groundwater (Figure 6).

HYDROLOGIC DATA

The development of the base hydrologic data utilized in the erosion and sedimentation analyses is described in the Hydrology section. The hydrologic input consists of a recreation of streamflow for the study area based on recorded data for the Gila River, Salt River and tributaries to those rivers in the study area. Mean daily discharges in the study area exceeding the channel forming discharge (35,000 cfs) are used. The period of record that was inspected is from 1921 through 2004. In addition, a synthetic 100-year flood is incorporated into the hydrologic data.

Figure 3. Surface Gravel in Gila River

Figure 4. Sediment Under Surface Gravel

Figure 5. Trench Excavated in Overbank Area

Figure 6. Trench Excavated in Main Channel

HYDROLOGY INPUT FOR HEC-6T MODEL

PURPOSE

The major independent variable in sediment transport modeling is stream discharge. This is because the model uses streamflow data in the form of a discretized hydrograph to calculate the sediment transport rate and sediment volume. The sediment transport model for El Rio has two purposes: first, to establish baseline sediment transport characteristics for the existing river, and second to evaluate the recommended alternative regarding sediment transport. In order to accomplish both tasks, a quasi-synthetic discretized hydrograph is developed from gaged historic flows and the estimated 100-year flood.

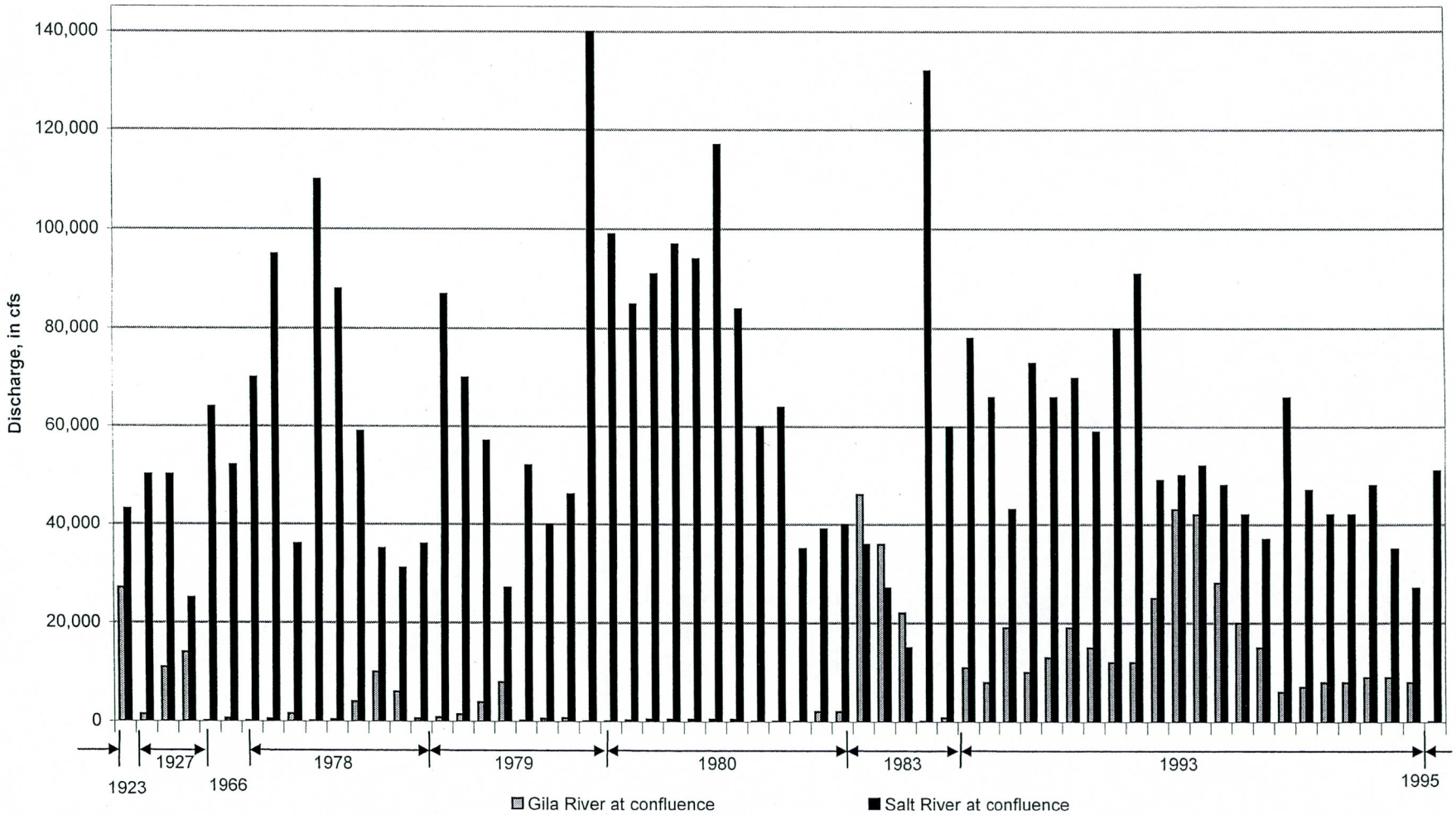
The incoming sediment characteristics (sediment load, concentration and size distribution) of the Gila and the Salt Rivers are significantly different, as discussed below. This means that each river provides different sediment loading to the El Rio reach. Additionally, the flood discharge of the two rivers is often vastly different (Figure 7), with the majority of flooding through the study reach originating in the Salt River watershed. Therefore, to properly model the sediment transport of the Gila River through the study area, the streamflows from both the Gila River and the Salt River must be separately input to the HEC-6T model.

The Gila River has only one major dam upstream of the study area, the San Carlos Dam, and clear water release from that dam has ample opportunity to reestablish its equilibrium sediment transport regime prior to joining the Salt River. Additionally, the Gila River has much finer bed material size gradation than the Salt River. Therefore, the Gila River will carry a higher concentration of sediment than the Salt River, and a larger component of wash load and sand bed material load.

The Salt River and its major runoff-producing tributary, the Verde River, have numerous large storage dams; therefore, a large portion of sediment is trapped in the upstream reservoirs. Additionally, the Salt River has larger bed material size gradation than the Gila River. That size gradation difference is exacerbated by the in-stream sand and gravel mining in the Salt River between Granite Reef Dam and the study area. Also, the Salt River upstream of the confluence is channelized through the urbanized metropolitan area of Phoenix and Tempe. The combination of numerous upstream storage dams, in-stream sand and gravel mining and the chanelization of the Salt River results in the delivery of a lower concentration of sediment, coarser bed material load and less wash load than the Gila River. However, during major flooding events the water discharge from the Salt River is usually much greater than the Gila River, so in most cases the Salt River contributes a majority of the total inflowing sediment load.

Two tributaries enter the Gila River within the study area, the Agua Fria River and Waterman Wash. Since the Agua Fria River enters the study area at its upper end, the contribution of streamflow from the Agua Fria River is incorporated into the streamflow of the Salt River at its confluence with the Gila River. Waterman Wash generally has only minor contributions of streamflow to the Gila River during floods. The

Figure 7
Estimated historic flood mean daily discharges
for the Gila River and Salt River at the confluence



incorporation of inflow from Waterman Wash is inconsequential to this sediment transport analysis for El Rio, and as such, inflow from Waterman Wash is not included in the model hydrology.

Method of Modeling Streamflow for El Rio

The streamflow for the El Rio HEC-6T model consists of a time series of discretized discharges for both the Gila River and the Salt River at the confluence of those rivers. A quasi-synthetic record of streamflow is developed for the study area based on recorded streamflow data and other information. It is termed quasi-synthetic because, although it is derived from regional records of streamflow, the hydrologic input to the HEC-6T model is not an attempt to recreate the historic streamflow that actually occurred. Rather, the hydrologic input represents reasonable approximations of the magnitudes and durations of selected floods for the period from 1921 through 2004. The hydrologic input also includes a theoretically derived estimate of the 100-year flood hydrograph.

For a large majority of daily streamflows of the Gila River, the fluvial sediment load is small and the flow has little, if any, channel forming potential (low energy). Those low energy flows are typically less than the bankful discharge. At those low discharges, the streamflow occupies the braided channels of the Gila River. However, at bankful discharge and greater, the flow of the Gila River has the energy to transport sediment at sufficiently high rates to "form" the channel via bed material transport and bank erosion. The threshold of that channel forming discharge is estimated to be in the range of 30,000 to 50,000 cfs. For the El Rio sediment transport model, that threshold discharge is assumed to be approximately the 10-year flood discharge. Flood discharges are included in the hydrologic input if they equal or exceed 35,000 cfs through the El Rio study area.

In order to establish baseline sediment transport characteristics for the existing river and to evaluate the recommended alternative regarding sediment transport, the HEC-6T model is executed for two conditions: the existing condition and the condition for the recommended alternative. The same series of discretized hydrologic discharges is used for both the existing condition and the recommended alternative. By comparing the results of the two models, the impact of the recommended alternative can be assessed against the existing condition.

Available Data and Historic Streamflow

The streamflow data was taken from mean daily discharge records that are published by the U.S. Geological Survey (USGS). The streamflow data for one gaging station (Salt River at Granite Reef Dam) was provided by the Salt River Project (SRP). Table 1 shows discharge values from the USGS website and the SRP data. Additional information about the floods and flood producing storms was obtained from reports of the U.S. Army Corps of Engineers and the Flood Control District of Maricopa County. The supplemental information was used to assist in the interpretation of streamgage data when that data was inconclusive as to the streamflow in the El Rio study area.

TABLE 1

Mean daily discharge of the floods on the Gila River and tributaries

Date	Santa Cruz R @ Laveen Gage 09489000 cfs	Gila R near Laveen Gage 09479500 cfs	Gila R at Confluence (Cols 2+3) cfs	Salt R @ Granite Reef Dam SRP cfs	Salt R @ Alma Sch Rd Gage 09512060 cfs	Indian Bend Wash @ Curry Road Gage 09512162 cfs	Salt R @ Jointhead Dam Gage 09512170 cfs	Agua Fria R @ Avondale Gage 09513970 cfs	Gila R @ Estrella Pkwy Gage 09514100 cfs	Gila R @ SR85 near Buckeye Gage 09514300 cfs	Hassayampa R near Arlington Gage 09517000 cfs	Centennial Wash @ Southern Pacific Railroad Gage 09517490 cfs	Gila R @ Gillespie Dam Gage 09518000 cfs	Gila R below Gillespie Dam Gage 09519500 cfs
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
12/28/1923	NA	NA	NA	42,800	NA	NA	NA	NA	NA	NA	NA	NA	NA	70,000
2/17/1927	NA	NA	NA	49,800	NA	NA	NA	NA	NA	NA	NA	NA	NA	51,200
2/18/1927	NA	NA	NA	49,200	NA	NA	NA	NA	NA	NA	NA	NA	NA	60,000
2/19/1927	NA	NA	NA	25,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	38,700
12/31/1965	1	13	14	64,000	NA	NA	NA	NA	NA	NA	NA	NA	1,450	1,380
1/1/1966	0	573	573	53,000	NA	NA	NA	NA	NA	NA	NA	NA	13,400	13,300
3/2/1978	21	2	23	70,600	NA	NA	NA	7,000	NA	NA	4,540	NA	4,980	4,920
3/3/1978	36	437	473	95,800	NA	NA	NA	2,200	NA	NA	2,430	NA	39,600	39,500
3/4/1978	561	973	1,534	37,000	NA	NA	NA	2,400	NA	NA	NA	NA	80,800	80,700
12/19/1978	69	24	93	110,000	NA	NA	NA	11,400	NA	NA	2,170	NA	865	793
12/20/1978	49	328	377	88,300	NA	NA	NA	3,650	NA	NA	NA	NA	90,400	90,400
12/21/1978	1,140	2,520	3,660	59,400	NA	NA	NA	145	NA	NA	NA	NA	76,400	76,400
12/22/1978	3,540	6,130	9,670	35,000	NA	NA	NA	10	NA	NA	NA	NA	53,200	53,200
12/23/1978	2,000	3,950	5,950	31,000	NA	NA	NA	0	NA	NA	NA	NA	43,300	43,300
1/17/1979	295	310	605	36,000	NA	NA	NA	3,720	NA	NA	1,060	NA	1,410	1,390
1/18/1979	435	377	812	87,500	NA	NA	NA	5,980	NA	NA	NA	NA	10,800	10,800
1/19/1979	352	1,070	1,422	70,100	NA	NA	NA	4,670	NA	NA	NA	NA	79,300	79,300
1/20/1979	1,050	2,860	3,910	56,800	NA	NA	NA	1,500	NA	NA	NA	NA	73,200	73,200
1/21/1979	1,860	6,160	8,020	26,700	NA	NA	NA	188	NA	NA	NA	NA	59,700	59,700
3/29/1979	51	192	243	51,800	NA	NA	NA	2,770	NA	NA	NA	NA	21,900	21,900
3/30/1979	6	585	591	40,600	NA	NA	NA	1,090	NA	NA	NA	NA	54,700	54,600
3/31/1979	1	682	683	46,460	NA	NA	NA	442	NA	NA	NA	NA	45,800	45,700
2/16/1980	27	9	36	137,725	NA	NA	132,000	4,720	NA	143,000	NA	NA	112,000	112,000
2/17/1980	40	5	45	67,700	NA	NA	80,300	2,200	NA	99,400	NA	NA	124,000	124,000
2/18/1980	4	315	319	72,250	NA	NA	85,900	2,080	NA	86,000	NA	NA	83,900	83,900
2/19/1980	33	444	477	53,740	NA	NA	71,900	1,830	NA	92,000	NA	NA	88,700	88,700
2/20/1980	68	466	534	55,430	NA	NA	70,000	19,400	NA	98,000	3,410	NA	98,300	98,300
2/21/1980	32	491	523	82,484	NA	NA	78,000	13,100	NA	95,000	734	NA	93,300	93,300
2/22/1980	2	526	528	89,640	NA	NA	87,000	11,600	NA	118,000	NA	NA	108,000	108,000
2/23/1980	0	495	495	54,730	NA	NA	53,000	3,800	NA	84,800	NA	NA	78,900	78,900
2/24/1980	0	137	137	52,693	NA	NA	49,000	1,500	NA	60,000	NA	NA	59,700	59,700
2/25/1980	0	6	6	49,003	NA	NA	38,000	500	NA	64,000	NA	NA	56,000	56,000
2/26/1980	0	3	3	18,389	NA	NA	23,000	100	NA	35,000	NA	NA	38,300	38,300
10/2/1983	2,000	10	2,010	39,383	NA	NA	NA	NA	NA	NA	0	0	222	200
10/3/1983	2,000	8	2,008	39,878	NA	NA	NA	NA	NA	NA	NA	0	28,100	28,100
10/4/1983	18,000	28,000	46,000	36,257	NA	NA	NA	NA	NA	NA	NA	0	41,800	41,800
10/5/1983	15,500	20,000	35,500	27,304	NA	NA	NA	NA	NA	NA	NA	0	77,000	77,000
10/6/1983	13,000	9,000	22,000	15,399	NA	NA	NA	NA	NA	NA	NA	0	67,500	67,500
1/9/1993	28	0	28	99,397	89,500	730 e	NA	NA	132,000 e	NA	437	0	130,000 e	130,000 e
1/10/1993	772	0	772	43,892	45,400	700 e	NA	NA	61,700 e	NA	5	35	60,000 e	60,000 e
1/11/1993	3,370	7,980	11,350	56,255	60,900	1,970 e	NA	NA	89,300	NA	116	2,540 e	75,000 e	75,000 e
1/12/1993	2,670	5,020	7,690	46,236	46,000	700 e	NA	NA	73,900	NA	20	0 e	65,000 e	65,000 e
1/13/1993	2,440	17,000	19,440	39,271	37,800	30 e	NA	NA	62,400	NA	7	0 e	60,000 e	60,000 e
1/14/1993	3,030	6,460	9,490	33,740	31,900	0 e	NA	NA	82,800	NA	6	0	65,000 e	65,000 e
1/15/1993	1,840	11,100	12,940	36,429	32,500	140 e	NA	NA	79,100	NA	42	0	65,000 e	65,000 e
1/16/1993	1,880	16,800	18,680	51,815	48,600	150 e	NA	NA	88,700	NA	15	0	80,000 e	80,000 e
1/17/1993	598	14,300	14,898	46,310	42,300	200 e	NA	NA	74,400	NA	454	0	75,000 e	75,000 e
1/18/1993	165	12,300	12,465	72,417	89,700	400 e	NA	NA	92,800	NA	195	0	90,000 e	90,000 e
1/19/1993	78	11,800	11,878	68,943	88,400	380 e	NA	NA	103,000	NA	181	0	85,000 e	85,000 e
1/20/1993	1,480	23,800	25,280	42,592	58,700	140 e	NA	NA	74,400	NA	44	0	70,000 e	70,000 e
1/21/1993	9,460	33,300	42,760	42,566	57,200	30 e	NA	NA	92,500	NA	37	0	85,000 e	85,000 e
1/22/1993	5,050	36,500	41,550	33,358	47,600	0 e	NA	NA	93,600	NA	36	0	80,000 e	80,000 e
1/23/1993	2,150	26,100	28,250	26,978	37,400	0 e	NA	NA	76,400	NA	37	0	65,000 e	65,000 e
1/24/1993	989	18,500	19,489	24,932	31,600	0 e	NA	NA	61,600	NA	36	0	50,000 e	50,000 e
1/25/1993	317	14,300	14,617	24,210	28,800	0 e	NA	NA	51,400	NA	35	0	45,000 e	45,000 e
2/21/1993	1	6,460	6,461	47,961	44,600	0 e	NA	NA	72,900	NA	746	0	60,000 e	60,000 e
2/22/1993	30	7,350	7,380	40,174	30,200	0 e	NA	NA	54,200	NA	500 e	0	50,000 e	50,000 e
2/23/1993	42	6,690	6,732	39,292	29,600	0 e	NA	NA	49,600	NA	450 e	0	50,000 e	50,000 e
2/24/1993	6	8,540	8,546	38,307	29,100	0 e	NA	NA	51,000	NA	400 e	0	45,000 e	45,000 e
2/25/1993	2	9,170	9,172	28,797	22,700	0 e	NA	NA	47,600	NA	340 e	0	35,600	35,600
2/26/1993	1	8,680	8,681	18,520	16,500	0 e	NA	NA	34,800	NA	300 e	0	29,900	29,900
2/27/1993	1	7,720	7,721	14,823	13,600	0 e	NA	NA	27,400	NA	230 e	0	24,500	24,500
2/16/1995	17	0	17	42,475	NA	0	NA	NA	51,400	NA	470 e	0	50,100 e	50,000 e

Notes on USGS data:

e- Value has been edited or estimated by USGS personnel and is write protected

NA - Not Available

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Regrettably, the USGS has not maintained a streamgage in the study area over a continuous, long period of record. The nearest long-term USGS streamgages are for the Gila River at/below Gillespie Dam (streamgage nos. 09518500 and 09519500). Those gages provide a nearly continuous record from 1921 to 2004. Because of their long record, those gages help illustrate the variability of streamflow and floods for the study area.

Figure 8 illustrates the instantaneous peak discharges for the USGS gage on the Gila River at Gillespie Dam. It should be noted that the HEC-6T model hydrology is based on mean daily discharge data, and not on the instantaneous flood peaks. The following are noted from Figure 8:

- The largest historic flood was February 1891 at 250,000 cfs (estimated).
- The largest recorded peak discharge was February 1980 at 178,000 cfs.
- Only two other floods had peak discharges in excess of 100,000 cfs: 130,000 cfs in January 1993 and 125,000 cfs in December 1978.
- There are 16-years (1891 through 2004) that the 10-year flood discharge (38,000 cfs) was exceeded.
- There are long periods without floods; 1942-1965, 1967-1977, and 1985-1992.

Figure 9 illustrates the annual USGS water year (October through September) runoff volume for the Gila River at Gillespie Dam. The following are noted from Figure 9:

- By far, the largest runoff volume occurred in 1993 (the runoff volume for the 1891 flood is not available).
- The flow of the Gila River is very erratic. Long periods of very small runoff are often followed by extremely large floods.

Figure 10 illustrates the mean daily discharge for the Gila River at Gillespie Dam. The following are noted from Figure 10:

- The largest recorded mean daily discharge was 130,000 cfs in January 1993.
- For the vast majority of days, the mean daily discharge is less than 1,000 cfs.
- For the period of record (1921 through 2004), only 61 days had a mean daily discharge in excess of the channel forming discharge of 35,000 cfs.
- Floods of extremely high magnitude occur.
- Floods usually are of short duration.

Figure 8
Annual Peak Discharges - Gila River at Gillespie Dam

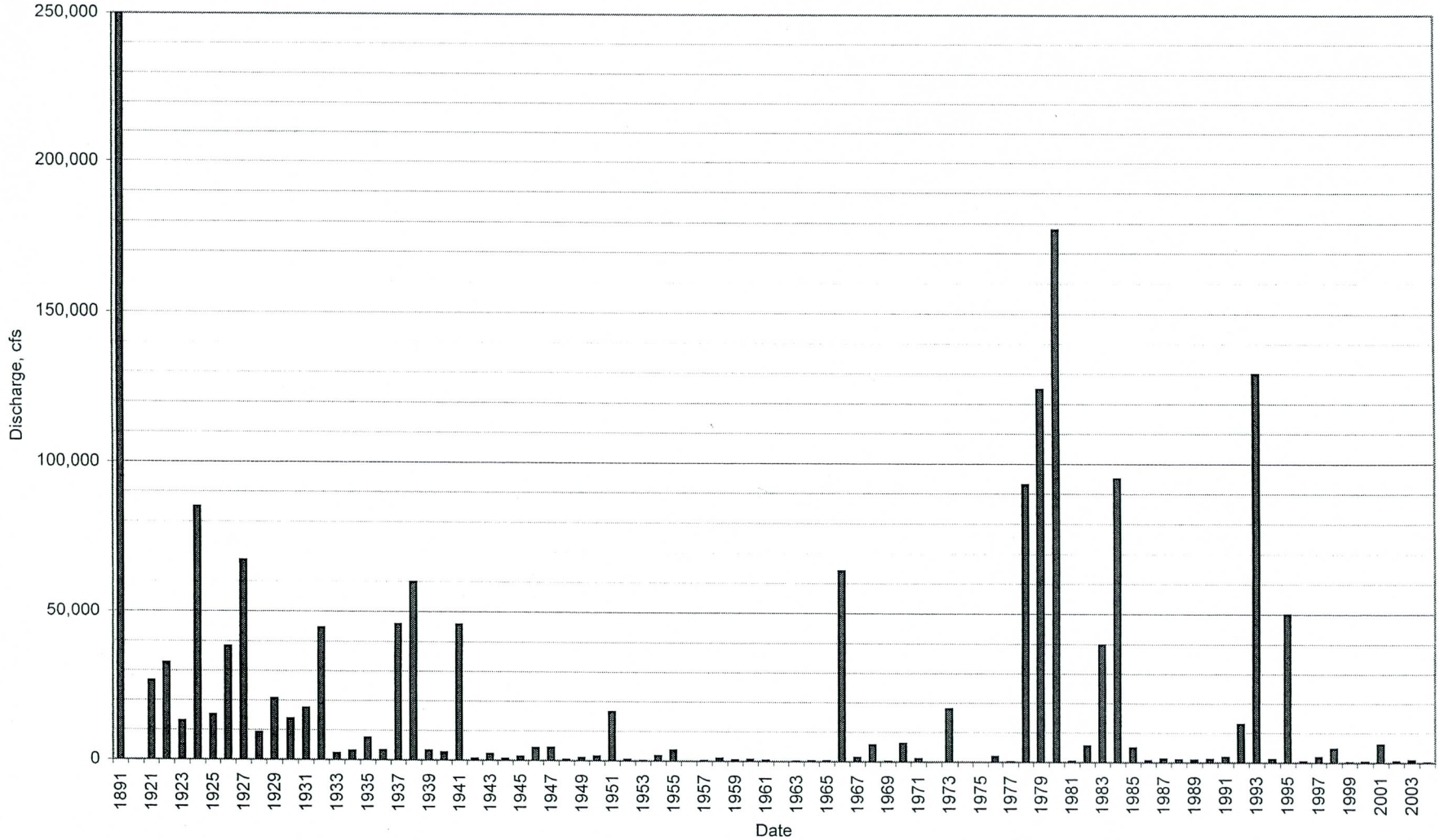


Figure 9
Annual runoff volume - Gila River at Gillespie Dam

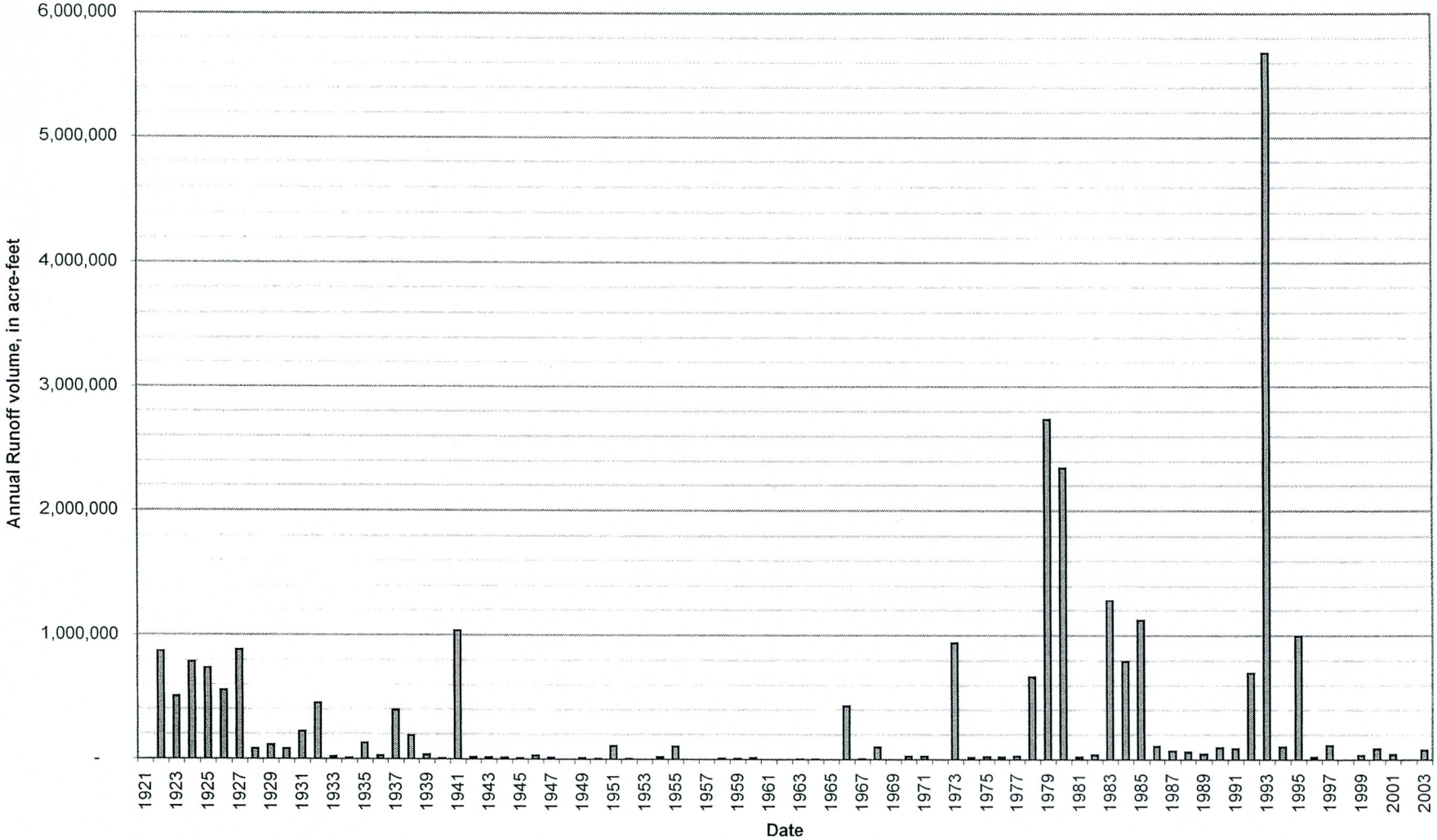
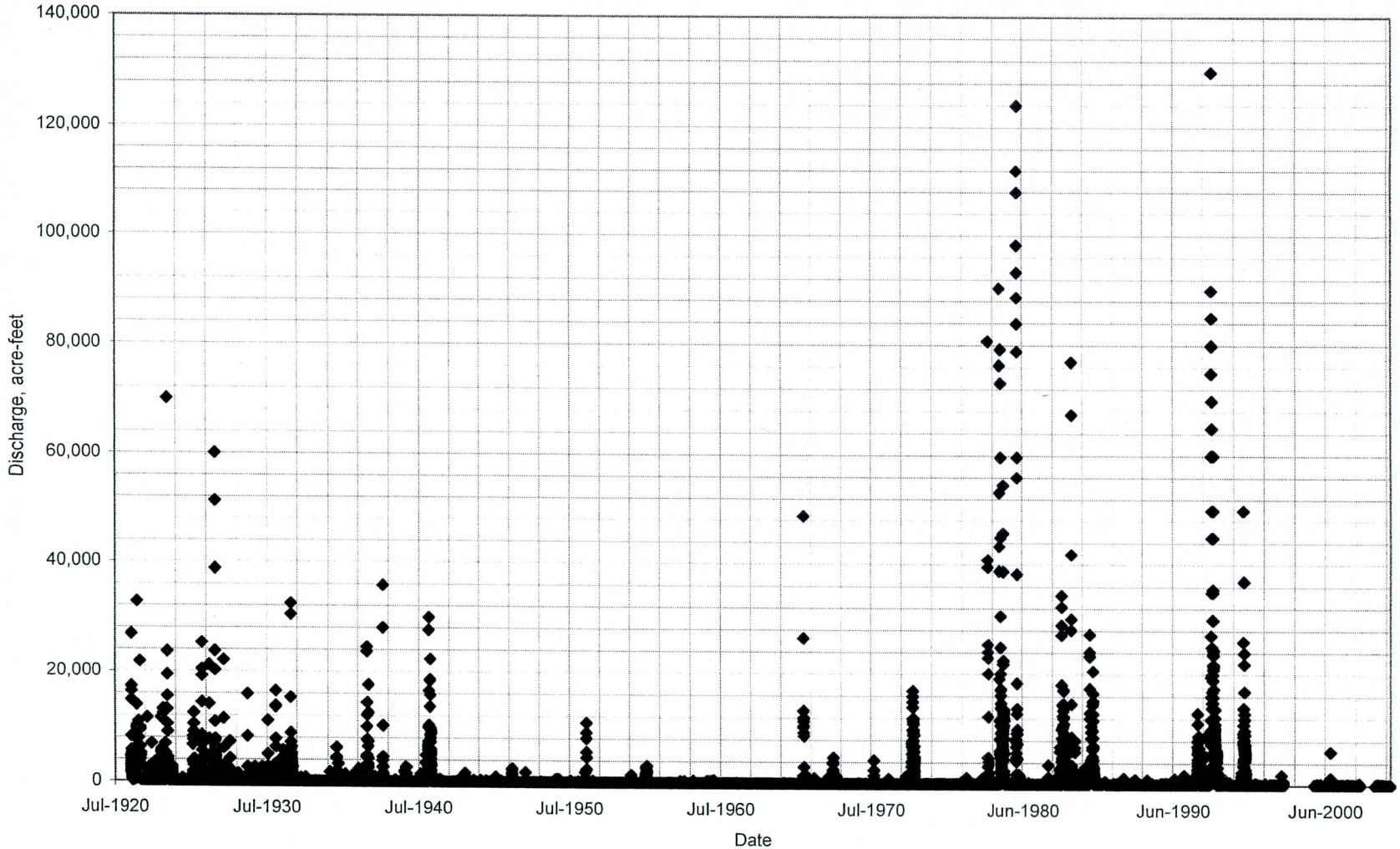


Figure 10
Mean Daily Discharge for Gage 09519500 - Gila River Below Gillespie Dam (August 1921 through September 2004)



Inspection of those figures demonstrates that during a period of about 80 years, only 61 days had channel-forming discharges. The 1993 flood had 24 days of channel forming discharge and therefore the 1993 flood produced sediment volumes that far surpassed any other flood of record. Because of this fact, and the availability of USGS sediment data, the 1993 flood is used to verify the HEC-6T model.

The following streamgages were used to develop the streamflow input for the El Rio HEC-6T model:

Gila River

near Laveen, no. 09479500

at Estrella Pkwy., no 09514100

at SR 85 Bridge, no. 09514300

above diversions at Gillespie Dam, no. 09518000

below Gillespie Dam, no. 09519500

Salt River

at Granite Reef Dam (SRP gage)

at Alma School Road, no. 09512060

at Jointhead Dam, no. 09512170

Tributaries

Indian Bend Wash at Curry Road, no. 09512162

Santa Cruz River at Laveen, no. 09489000

Agua Fria River at Avondale, no. 09513970

Hassayampa River near Arlington, no. 09517000

Centennial Wash at Southern Pacific RR Bridge, no. 09517490

A spreadsheet of streamflow data is provided in Table 1, and gage locations are shown on Figure 1.

Inspection of streamgage data along with supplemental information reveals the following:

1. The travel time between peak discharges on the Salt River at Granite Reef Dam to the Gila River at Gillespie Dam ranges from one to two days.

2. The attenuation of the peak discharge over the 71 miles between Granite Reef Dam to Gillespie Dam is probably due to the effects of channel storage. That is, on the rising limb of the hydrograph, some of the peak discharge is reduced as water is used to fill the downstream channel. On the recession of the hydrograph, the discharge at Gillespie Dam is generally greater than at Granite Reef Dam due to the "draining" of the downstream channel storage.

3. The major tributaries between Granite Reef Dam and Gillespie Dam (Indian Bend Wash, Agua Fria River, Waterman Wash, Hassayampa River and Centennial Wash) often have missing data or were not gaged.

4. Data are not available to estimate all of the flood discharges in the Salt and Gila Rivers for the period from 1921 to 2004 with a high level of accuracy.

Development of Historic Streamflow Input for El Rio HEC-6T

As can be seen in Table 1, different gages were in operation during the floods. In order to approximate the flow through the El Rio reach during each flood, the events were considered individually and compared to qualitative data obtained from reports of the U.S. Army Corps of Engineers and the Flood Control District of Maricopa County. The results of that evaluation are summarized as follows:

28 December 1923 – Referring to Table 1, the available data is 42,800 cfs for the Salt River at Granite Reef Dam and 70,000 cfs for the Gila River at Gillespie Dam. Lacking other information, the following are used in the model:

	Gila River	Salt River	Combined
28 Dec 1923	27,000 cfs	43,000 cfs	70,000 cfs

17-19 February 1927 – Referring to Table 1, data are only available for the Salt River at Granite Reef Dam and the Gila River at Gillespie Dam. Lacking other information, the following are used in the model:

	Gila River	Salt River	Combined
17 Feb 1927	1,400 cfs	50,000 cfs	51,400 cfs
18 Feb 1927	11,000 cfs	50,000 cfs	61,000 cfs
19 Feb 1927	14,000 cfs	25,000 cfs	39,000 cfs

31 December 1965 – 1 January 1966 – An expanded set of relevant streamflow data is shown in Table 2. That data shows that the Gila River was a small contributor to that flood, and that the peak discharge (as measured for the Salt River at Granite Reef Dam) was attenuated as it traveled to the gage on the Gila River at Gillespie Dam. Much of that attenuation was due to channel storage between those two gaging stations. It is assumed that the discharge as measured for the Salt River at Granite Reef Dam occurred in the El Rio study reach.

TABLE 2

Mean Daily Discharges for the December 1965/January 1966 Flood

Date	Salt R @ Granite Reef Dam cfs	Gila R near Laveen Cfs	Santa Cruz R @ Laveen cfs	Gila R below Gillespie Dam Cfs
(1)	(2)	(3)	(4)	(5)
12/26/1965	2,100	7,040	2,730	730
12/27/1965	990	1,580	1,250	730
12/28/1965	0	288	327	760
12/29/1965	0	32	30	1,030
12/30/1965	6,100	7	3	1,560
12/31/1965	64,000	13	1	1,380
1/1/1966	53,000	573	0	13,300
1/2/1966	17,000	627	0	48,800
1/3/1966	11,000	133	5	26,500
1/4/1966	12,000	11	2	10,400
1/5/1966	12,000	0	1	9,410
1/6/1966	13,000	0	0	10,600
1/7/1966	13,000	0	0	11,400
1/8/1966	13,000	0	0	12,100
1/9/1966	12,000	0	0	11,900
1/10/1966	11,000	0	0	12,000
1/11/1966	1,000	0	0	12,000

Based on that data and assumptions, the following are used in the model:

	Gila River	Salt River	Combined
31 Dec 1965	100 cfs	64,000 cfs	64,100 cfs
1 Jan 1966	600 cfs	52,000 cfs	52,600 cfs

2-4 March 1978 – An expanded set of relevant streamflow data is show in Table 3. That data indicates that the discharge for the Salt River at Granite Reef Dam is attenuated as it flows to Gillespie Dam. That attenuation is assumed to be due to channel storage in the very wide Gila River floodplain. The data also shows that there was only a small contribution from the Gila River plus Santa Cruz River. Also, that the Agua Fria River and Hassayampa River have recorded discharges indicating tributary inflow to the Salt and Gila Rivers. For the Gila River, the sum of the Gila River near Laveen and the Santa Cruz River at Laveen is used. For the Salt River, the discharge at Granite Reef Dam is used. It is assumed that inflow from the Agua Fria River compensates for attenuation from Granite Reef Dam.

TABLE 3

Mean Daily Discharges for the February/March 1978 Flood

Date	Salt R @ Granite Reef Dam	Gila R near Laveen	Santa Cruz R @ Laveen	Agua Fria R @ Avondale	Hassayampa R near Arlinton	Gila R below Gillespie Dam
	cfs	Cfs	Cfs	cfs	cfs	cfs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2/26/1978	0	0	0	0	N/A	83
2/27/1978	0	0	0	0	N/A	70
2/28/1978	0	0	1	200	N/A	110
3/1/1978	3,000	0	24	3,100	2,700	113
3/2/1978	70,600	2	21	7,000	4,540	4,920
3/3/1978	95,800	437	36	2,200	2,430	39,500
3/4/1978	37,000	973	561	2,400	N/A	80,700
3/5/1978	21,900	1,120	790	1,900	N/A	40,800
3/6/1978	19,500	1,680	932	6,200	N/A	23,000
3/7/1978	16,700	1,310	395	1,600	N/A	25,400

TABLE 3

Mean Daily Discharges for the February/March 1978 Flood

Date	Salt R @ Granite Reef Dam	Gila R near Laveen	Santa Cruz R @ Laveen	Agua Fria R @ Avondale	Hassayampa R near Arlinton	Gila R below Gillespie Dam
	cfs	Cfs	Cfs	cfs	cfs	cfs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
3/8/1978	400	424	40	600	N/A	20,100
3/9/1978	0	141	0	100	N/A	24,100
3/10/1978	0	26	0	0	N/A	12,400
3/11/1978	0	1	0	0	N/A	3,270
3/12/1978	239	0	0	0	N/A	1,700
3/13/1978	281	1	10	0	N/A	1,210
3/14/1978	25	24	55	0	N/A	778

The following are used in the model:

	Gila River	Salt River	Combined
2 Mar 1978	100 cfs	70,000 cfs	70,100 cfs
3 Mar 1978	500 cfs	95,000 cfs	95,500 cfs
4 Mar 1978	1,500 cfs	36,000 cfs	37,500 cfs

19 – 23 December 1978 – An expanded set of streamflow data is shown in Table 4. That data also shows the attenuation of flows from the Salt River at Granite Reef Dam to the Gila River at Gillespie Dam. The data also shows significant flow in the Gila River. The inflow from the Agua Fria River is assumed to compensate for attenuation from Granite Reef Dam.

TABLE 4

Mean Daily Discharges for the December 1978 Flood

Date	Salt R @ Granite Reef Dam	Gila R near Laveen	Santa Cruz R @ Laveen	Agua Fria R @ Avondale	Hassayampa R near Arlinton	Gila R below Gillespie Dam
	cfs	cfs	cfs	cfs	cfs	cfs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
12/15/1978	0	5	0	0	N/A	2
12/16/1978	0	3	0	0	N/A	2
12/17/1978	500	5	22	0	N/A	3
12/18/1978	30,800	31	201	921	N/A	3
12/19/1978	110,000	24	69	11,400	2,170	793
12/20/1978	88,300	328	49	3,650	N/A	90,400
12/21/1978	59,400	2,520	1,140	145	N/A	76,400
12/22/1978	35,000	6,130	3,540	10	N/A	53,200
12/23/1978	31,000	3,950	2,000	0	N/A	43,300
12/24/1978	9,400	1,560	476	0	N/A	38,800
12/25/1978	9,400	782	74	0	N/A	19,200
12/26/1978	7,000	332	9	0	N/A	11,700
12/27/1978	6,500	251	2	0	N/A	8,330
12/28/1978	5,500	42	1	0	N/A	6,180
12/29/1978	4,400	20	1	0	N/A	5,570
12/30/1978	2,400	16	51	0	N/A	5,740
12/31/1978	1,500	19	58	0	N/A	4,910

The following are used in the model:

	Gila River	Salt River	Combined
19 Dec 1978	100 cfs	110,000 cfs	110,100 cfs
20 Dec 1978	400 cfs	88,000 cfs	88,400 cfs
21 Dec 1978	4,000 cfs	59,000 cfs	63,000 cfs
22 Dec 1978	10,000 cfs	35,000 cfs	45, 000 cfs
23 Dec 1978	6,000 cfs	31,000 cfs	37,000 cfs

17 – 21 January 1979 – An expanded set of relevant streamflow data is shown in Table 5. That data indicates that there was flow in the Gila River and Santa Cruz River. Those two discharges are added to estimate the discharge of the Gila River at the confluence. USGS data also shows minor inflow from the Hassyampa River. Flow from the Hassayampa enters downstream of the El Rio study reach and so does not affect the study reach, however it does contribute to streamflow at the Gillespie Dam gage. There was also inflow from the Agua Fria River, but that inflow is assumed to offset losses from Granite Reef Dam to the study reach.

TABLE 5

Mean Daily Discharges for the January 1979 Flood

Date	Salt R @ Granite Reef Dam	Gila R near Laveen	Santa Cruz R @ Laveen	Agua Fria R @ Avondale	Hassayampa R near Arlinton	Gila R below Gillespie Dam
	cfs	Cfs	cfs	cfs	cfs	cfs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1/14/1979	5	100	11	0	N/A	250
1/15/1979	5	100	8	0	N/A	250
1/16/1979	0	100	5	0	N/A	250
1/17/1979	36,000	310	295	3,720	1,060	1,390
1/18/1979	87,500	377	435	5,980	N/A	10,800
1/19/1979	70,100	1,070	352	4,670	N/A	79,300
1/20/1979	56,800	2,860	1,050	1,500	N/A	73,200
1/21/1979	26,700	6,160	1,860	188	N/A	59,700
1/22/1979	20,300	4,750	1,120	0	N/A	45,000

TABLE 5

Mean Daily Discharges for the January 1979 Flood

Date	Salt R @ Granite Reef Dam	Gila R near Laveen	Santa Cruz R @ Laveen	Agua Fria R @ Avondale	Hassayampa R near Arlinton	Gila R below Gillespie Dam
	cfs	Cfs	cfs	cfs	cfs	cfs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1/23/1979	19,100	1,980	280	0	N/A	30,600
1/24/1979	17,300	1,280	56	0	N/A	24,900
1/25/1979	16,200	892	61	0	N/A	20,100
1/26/1979	16,000	811	55	0	N/A	17,200
1/27/1979	14,100	881	360	0	N/A	16,200
1/28/1979	14,200	2,290	1,750	0	N/A	14,000
1/29/1979	13,400	2,460	1,970	0	N/A	14,800
1/30/1979	9,900	1,660	865	0	N/A	17,400

The following are used in the model:

	Gila River	Salt River	Combined
17 Jan 1979	600 cfs	36,000 cfs	36,600 cfs
18 Jan 1979	800 cfs	87,000 cfs	87,800 cfs
19 Jan 1979	1,400 cfs	70,000 cfs	71,400 cfs
20 Jan 1979	3,900 cfs	57,000 cfs	60,900 cfs
21 Jan 1979	8,000 cfs	27,000 cfs	35,000 cfs

29-31 March 1979 – An expanded set of relevant streamflow data is shown in Table 6. That data shows little flow from the Gila River and low inflow from the Agua Fria River, which is assumed to offset attenuation in the Salt River.

TABLE 6

Mean Daily Discharges for the March/April 1979 Flood

Date	Salt R @ Granite Reef Dam cfs	Gila R near Laveen Cfs	Santa Cruz R @ Laveen Cfs	Agua Fria R @ Avondale Cfs	Gila R below Gillespie Dam cfs
(1)	(2)	(3)	(4)	(5)	(6)
3/23/1979	10,980	2	4	0	8,130
3/24/1979	11,950	17	13	0	9,340
3/25/1979	11,970	32	11	0	9,970
3/26/1979	11,720	160	8	0	10,400
3/27/1979	14,970	320	7	0	10,500
3/28/1979	19,880	312	19	0	12,500
3/29/1979	51,800	192	51	2,770	21,900
3/30/1979	40,600	585	6	1,090	54,600
3/31/1979	46,460	682	1	442	45,700
4/1/1979	22,400	628	1	0	38,700
4/2/1979	11,800	477	3	0	22,500
4/3/1979	9,830	351	6	0	12,900
4/4/1979	11,140	340	1	0	10,800
4/5/1979	7,270	89	1	0	12,300
4/6/1979	2,060	5	3	0	8,530
4/7/1979	2,780	3	1	0	4,660
4/8/1979	6,100	2	1	0	2,520

The following are used in the model:

	Gila River	Salt River	Combined
29 Mar 1979	200 cfs	52,000 cfs	52,200 cfs
30 Mar 1979	600 cfs	40,000 cfs	40,600 cfs
31 Mar 1979	700 cfs	46,000 cfs	46,700 cfs

16-26 February 1980 – During this flood event, a gage existed at SR 85, the downstream end of the El Rio study reach. Using the data from that gage (Table 1) the recorded streamflow for the Gila River at SR 85 is used for the combined El Rio model discharge. The sum of the discharges for the Gila River near Laveen and the Santa Cruz River at Laveen is used for the Gila River.

The following are used in the model:

	Gila River	Salt River	Combined
16 Feb 1980	100 cfs	140,000 cfs	140,100 cfs
17 Feb 1980	100 cfs	99,000 cfs	99,100 cfs
18 Feb 1980	300 cfs	85,000 cfs	85,300 cfs
19 Feb 1980	500 cfs	91,000 cfs	91,500 cfs
20 Feb 1980	500 cfs	97,000 cfs	97,500 cfs
21 Feb 1980	500 cfs	94,000 cfs	94,500 cfs
22 Feb 1980	500 cfs	117,000 cfs	117,500 cfs
23 Feb 1980	500 cfs	84,000 cfs	84,500 cfs
24 Feb 1980	100 cfs	60,000 cfs	60,100 cfs
25 Feb 1980	100 cfs	64,000 cfs	64,100 cfs
26 Feb 1980	100 cfs	35,000 cfs	35,100 cfs

2-6 October 1983 – An expanded set of relevant streamflow data is shown in Table 7. That data shows the attenuation of the flow as it moves through the system to Gillespie Dam. There is also major inflow from the Gila River and the Santa Cruz River.

TABLE 7

Mean Daily Discharges for the September/October 1983 Flood

Date	Salt R @ Granite Reef Dam	Gila R near Laveen	Santa Cruz R @ Laveen	Hassayampa R near Arlington	Gila R below Gillespie Dam
	cfs	Cfs	cfs	cfs	cfs
(1)	(2)	(3)	(4)	(5)	(6)
9/28/1983	54	4	19	N/A	283
9/29/1983	234	10	351	N/A	711
9/30/1983	73	10	604	800	1,130
10/1/1983	1,896	9	2,000	0	205
10/2/1983	39,383	10	2,000	0	200
10/3/1983	39,878	8	2,000	N/A	28,100
10/4/1983	36,257	28,000	18,000	N/A	41,800
10/5/1983	27,304	20,000	15,500	N/A	77,000
10/6/1983	15,399	9,000	13,000	N/A	67,500
10/7/1983	8,731	3,000	2,000	N/A	30,100
10/8/1983	7,295	2,000	1,000	N/A	14,700
10/9/1983	6,855	2,270	500	N/A	8,700
10/10/1983	4,390	2,270	100	N/A	6,160
10/11/1983	3,573	2,170	25	N/A	3,570
10/12/1983	3,350	1,980	10	N/A	2,800
10/13/1983	3,790	1,670	6	N/A	2,580
10/14/1983	3,822	1,410	4	N/A	2,690

The following are used in the model:

	Gila River	Salt River	Combined
2 Oct 1983	2,000 cfs	39,000 cfs	41,000 cfs
3 Oct 1983	2,000 cfs	40,000 cfs	42,000 cfs
4 Oct 1983	46,000 cfs	36,000 cfs	82,000 cfs
5 Oct 1983	36,000 cfs	27,000 cfs	63,000 cfs
6 Oct 1983	22,000 cfs	15,000 cfs	37,000 cfs

9-25 January and 21-24 February 1993 – During this event, gage data are available for the Gila River at Estrella Parkway near the upstream end of the study reach (Table 1). The recorded streamflow at that gage is used for the combined El Rio model discharge. The sum of the discharges for the Gila River near Laveen and the Santa Cruz River at Laveen are used for the Gila River. The following are used in the model:

	Gila River	Salt River	Combined
9 Jan 1993	100 cfs	132,000 cfs	132,100 cfs
10 Jan 1993	800 cfs	60,000 cfs	60,800 cfs
11 Jan 1993	11,000 cfs	78,000 cfs	89,000 cfs
12 Jan 1993	8,000 cfs	66,000 cfs	74,000 cfs
13 Jan 1993	19,000 cfs	43,000 cfs	62,000 cfs
14 Jan 1993	10,000 cfs	73,000 cfs	83,000 cfs
15 Jan 1993	13,000 cfs	66,000 cfs	79,000 cfs
16 Jan 1993	19,000 cfs	70,000 cfs	89,000 cfs
17 Jan 1993	15,000 cfs	59,000 cfs	74,000 cfs
18 Jan 1993	12,000 cfs	80,000 cfs	92,000 cfs
19 Jan 1993	12,000 cfs	91,000 cfs	103,000 cfs
20 Jan 1993	25,000 cfs	49,000 cfs	74,000 cfs
21 Jan 1993	43,000 cfs	50,000 cfs	93,000 cfs
22 Jan 1993	42,000 cfs	52,000 cfs	94,000 cfs
23 Jan 1993	28,000 cfs	48,000 cfs	76,000 cfs
24 Jan 1993	20,000 cfs	42,000 cfs	62,000 cfs
25 Jan 1993	15,000 cfs	37,000 cfs	52,000 cfs
21 Feb 1993	6,000 cfs	66,000 cfs	72,000 cfs
22 Feb 1993	7,000 cfs	47,000 cfs	54,000 cfs
23 Feb 1993	8,000 cfs	42,000 cfs	50,000 cfs

24 Feb 1993	8,000 cfs	42,000 cfs	50,000 cfs
25 Feb 1993	9,000 cfs	48,000 cfs	57,000 cfs
26 Feb 1993	9,000 cfs	35,000 cfs	44,000 cfs
27 Feb 1993	8,000 cfs	27,000 cfs	35,000 cfs

16 February 1995 – Using the data in Table 1, the recorded streamflow for the Gila River at Estrella Parkway is used for the combined El Rio model discharge. There was little flow from the Gila River. The following are used in the model:

	Gila River	Salt River	Combined
16 Feb 1995	100 cfs	51,000 cfs	51,100 cfs

In summary, the assumptions that are used to develop the quasi-synthetic hydrograph of historic flooding for use with the HEC-6T model are:

1. The hydrologic input for the February 1980, January – February 1993 and February 1995 floods are reliable estimates of the actual flood discharges because data are available for those floods as measured at USGS streamgages.

2. Without additional data, the discharge of the Salt River at Granite Reef Dam is a reasonable estimate of the flow of the Salt River at the confluence with the Gila River for the purpose of sediment transport modeling of the El Rio study reach.

3. Without additional information, the discharge of the Gila River at its confluence is estimated as the gaged discharge of the Gila River at Gillespie Dam less the Salt River at Granite Reef Dam.

4. When data are available, the sum of the discharges for the Gila River near Laveen and the Santa Cruz River at Laveen is an estimate of the discharge of the Gila River at the confluence with the Salt River.

5. It is assumed that intervening ungaged inflow from the major tributaries and the Phoenix metropolitan area offsets conveyance losses between Granite Reef Dam and Gillespie Dam.

6. So as not to imply greater accuracy than is warranted based on available data, the discharges in the HEC-6T model are provided with no more than three significant figures.

7. Due to HEC-6T program limitations, a minimum streamflow input of 100 cfs is used for the Gila River even when that discharge is zero

100-year Flood Hydrograph

The 100-year instantaneous peak discharge for the Gila River in the El Rio study reach is estimated as 227,000 cfs. A 100-year flood hydrograph was synthesized as described in the El Rio Hydrology and Hydraulics Report. The discretized 100-year flood hydrograph is shown in Figure 11. The respective contributions to the 100-year flood from the Salt River and from the Gila River upstream of the confluence is estimated by the ratio of the 100-year flood peak discharge of the Salt River at Granite Reef Dam to the Gila River downstream of the confluence (See Tables 2-4, U.S. Army Corps of Engineers, 1996). That ratio is:

$$\frac{\text{175, 000 cfs for the Salt River at Granite Reef Dam}}{\text{227,000 cfs for the Gila River downstream of the confluence}} = 77\%$$

Therefore, 23% of the flood is from the Gila River upstream of the confluence. Comparison of the flows illustrated in Figure 7 verifies that the Salt River is usually the major contributor to floods of the Gila River in the study area.

Using those ratios and the 100-year flood hydrograph of Figure 11, the distribution of the 100-year flood between the Gila River and the Salt River is shown in Figure 12.

The 100-year flood input is:

Day	Gila River	Salt River	Combined
1	9,000	31,000	40,000
2	46,000	154,000	200,000
3	38,000	127,000	165,000
4	32,000	108,000	140,000
5	28,000	92,000	120,000
6	24,000	79,000	103,000
7	21,000	69,000	90,000
8	18,000	61,000	79,000
9	16,000	52,000	68,000
10	13,000	45,000	58,000
11	11,000	38,000	49,000
12	9,000	31,000	40,000

Figure 11
100-year Hydrograph for the Gila River at the Confluence with the Salt River

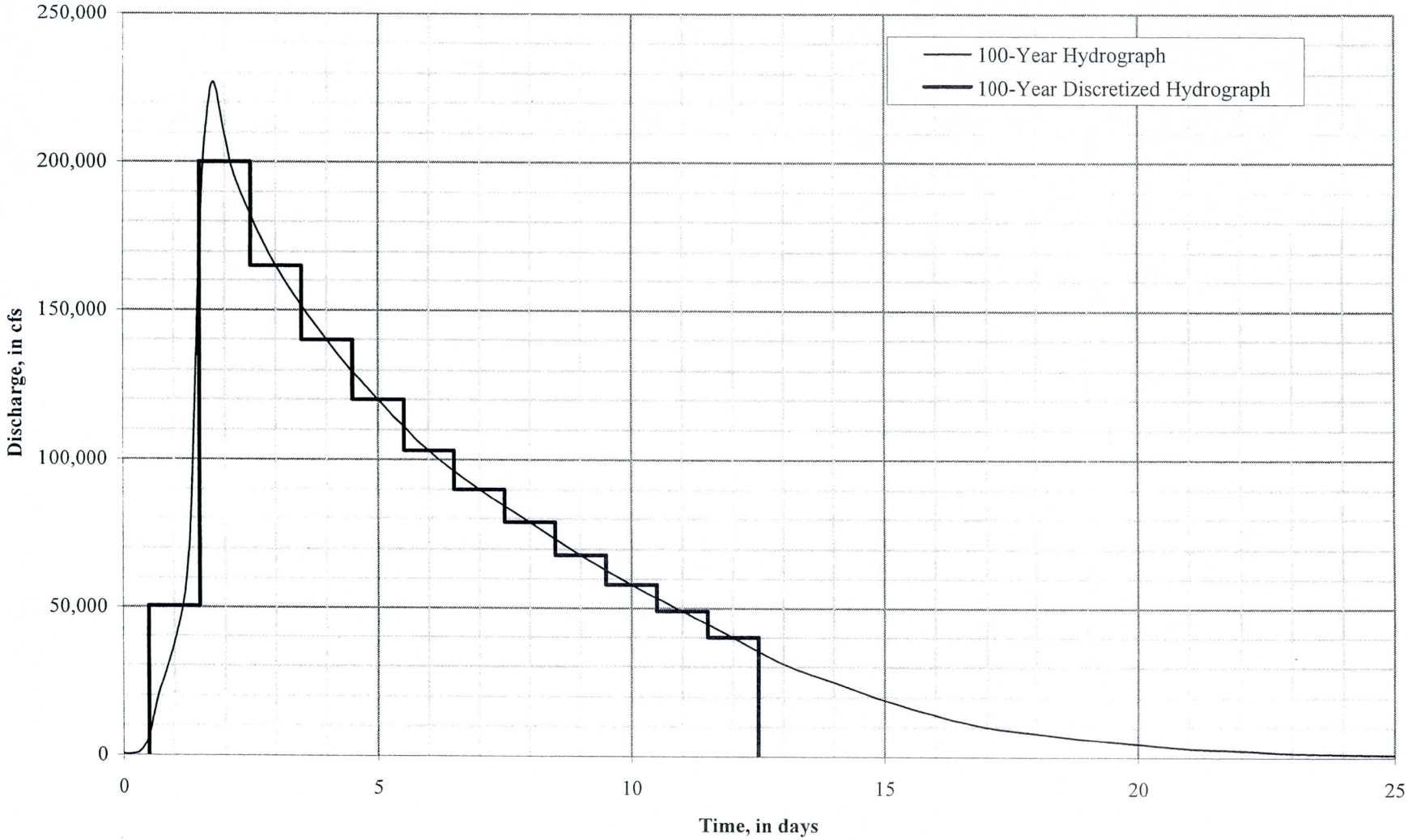
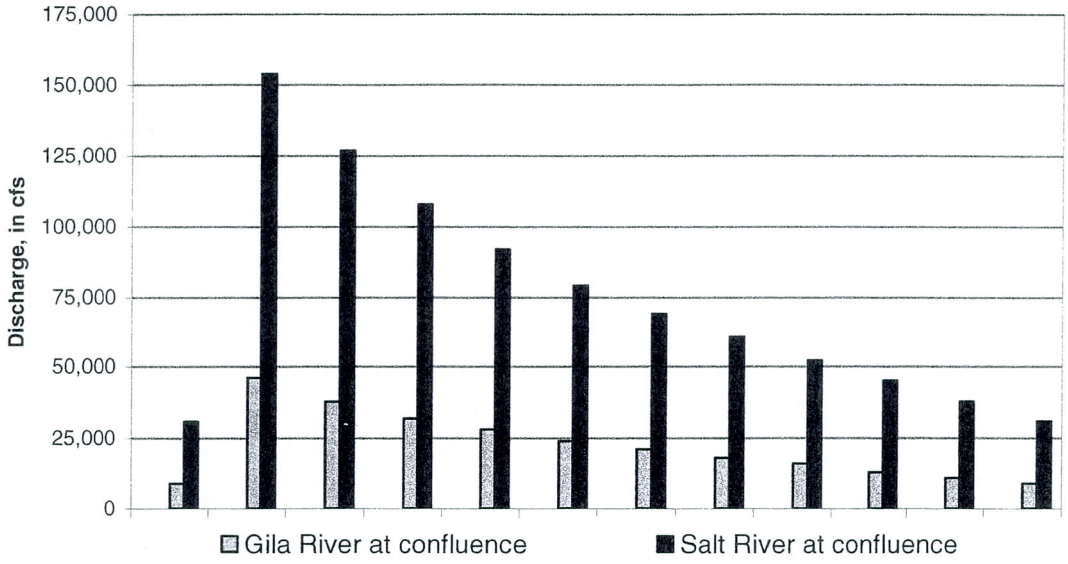


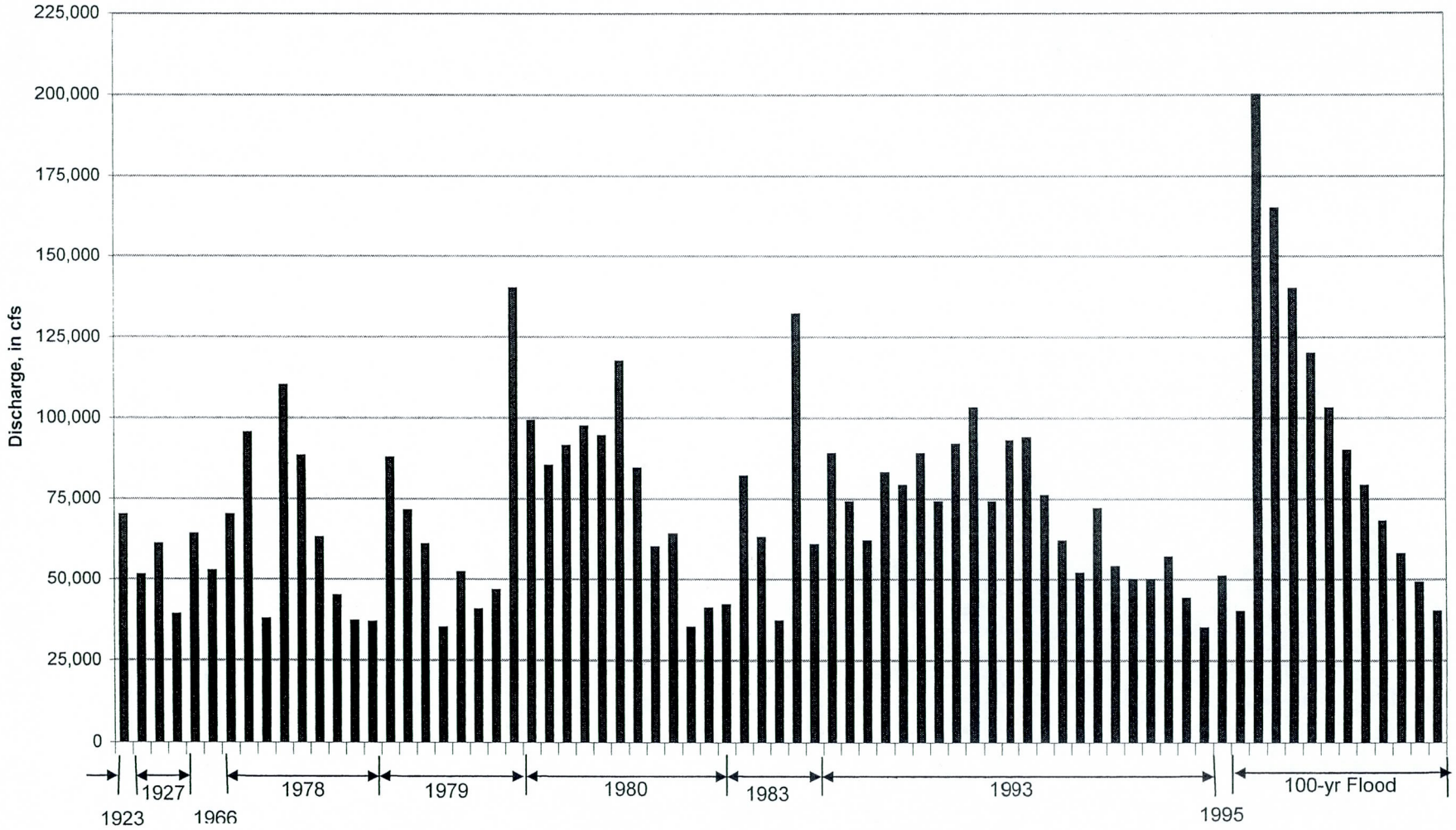
Figure 12
Estimated 100 year flood mean daily discharges for the Gila River and Salt River at the confluence



Summary of HEC-6T Model Hydrology

The streamflow input for the El Rio model is a quasi-synthetic representation of the streamflow of both the Gila River and the Salt River at their confluence. Streamflow data from the USGS and SRP are used to develop the HEC-6T hydrologic input. The quasi-synthetic record consists of 63 days of mean daily discharges of the Gila River. That record represents the channel forming discharges that passed through the El Rio study area from 1921 through 2004. In addition, for the purpose of assessing the sediment transport characteristics during a 100-year flood, that flood is discretized and added to the end of the quasi-synthetic record. A representation of the entire hydrologic input to the El Rio HEC-6T model is shown in Figure 13.

Figure 13
Mean Daily Discharge of the Gila River as modeled for the El Rio Study Area; representing historic floods plus the 100-year flood



GEOMORPHIC CHARACTERISTICS OF THE GILA RIVER

INTRODUCTION

Fluvial geomorphology is the study of the form and structure of land surfaces affected by flowing water (Biedenharn, 1997). Flowing water is the primary geomorphic process that defines drainage patterns, channels, floodplains and terraces in a river system. A geomorphic analysis provides an approach to classify/define a river system based on similar hydraulic and physical characteristics. Rosgen's (1996) list of specific objectives for a stream classification system includes the following:

- Predict a river's behavior from its characteristics.
- Develop specific hydraulic and sediment relationships for a given stream type and its state.
- Provide a mechanism to extrapolate site-specific data to stream reaches having similar characteristics.

The geomorphic characteristics of the Gila River provide information on the general physical form of the river, which aids in modeling the river for sediment transport. Having an understanding of the geomorphic process that forms the river also assists with the evaluation of the sediment transport model and with a physically based interpretation of the results of the model. This section provides some basic geomorphic properties of the river that were used to better construct the sediment transport models and to assist in the interpretation of the results of those models.

The geomorphic characterization of the Gila River in the study area is for the current (existing) condition (post-development for large scale irrigation, municipal and industrial water usage). The upstream depletions and construction of dams and other water storage/diversion/conveyance facilities since the advent of European settlement has severely impacted the geomorphic character of the river.

METHODOLOGY

River classification/characterization schemes used in this study are those of Schumm (1977 and 1981) and Rosgen (1996). Schumm channel classification is based on stream pattern, sediment load, and relative stability. Rosgen stream classification is based on physical and hydraulic characteristics and relationships. Physical features that are used for the characterization of the Gila River are; channel slope, channel pattern, sinuosity, entrenchment ratio, width-to-depth ratio, channel materials and dominant/bankfull discharge.

PHYSICAL CHARACTERISTICS

Watershed

The Gila River at the location of the study reach drains approximately 46,000 square miles. The vast majority of the watershed is undeveloped. A major exception is the Phoenix metropolitan area, which is contained within the watershed. Storm runoff from

that urbanized area generally has little impact on the form or function of the Gila River, except where local urban runoff may enter the river. Presently there are several major dams on the Gila River, Salt River and the Agua Fria River and numerous smaller dams in the watershed study area. Therefore, the existing physical form of the Gila River through the study reach is in response to both unregulated flood discharges prior to 1900, and regulated flood discharges in more recent years.

Channel

The existing Gila River within the study reach is an alluvial channel consisting of predominantly sand with some gravel and cobbles. The channel slope is about 0.0011 ft/ft (6 ft/mile). The width of the channel, as defined by the bankfull discharge, varies from approximately 1,500 feet to 8,700 feet with the average width of about 3,600 feet. The width of the flood hazard area defined by the Federal Emergency Management Agency (FEMA) 100-year floodplain delineation varies from approximately 2,000 feet to 12,500 feet with the average width of about 7,800 feet. The average cross sectional depth of flow (hydraulic depth) for the bankfull discharge ranges from approximately 3 to 10 feet with the study reach average of about 4.7 feet. The depth of flow (hydraulic depth) for the 100-year discharge ranges from approximately 6 to 16 feet with the study reach average of about 9.9 feet.

Channel patterns that exist in the study reach are classified as straight and braided. Where braided, the character of the braids include bars or islands that are long and narrow (relative to the width of the braid). According to discharge and channel slope relationships developed by Leopold and Wolman (1957), channel patterns can be inferred as to which rivers will be braided and which will be meandering. Figure 14 shows the relation developed by Leopold and Wolman (1957) to classify rivers that are braided and those that meander. The large dot is shown at a channel slope of 0.0011 ft//ft and a bankfull discharge of 46,000 cfs. As can be seen from that relation, the Gila River is a braided channel but near the threshold of a meandering river. From observation of the river, the Gila River in the El Rio study area behaves as a braided channel for discharges less than bankfull. During those discharges, there are short reaches of the river that are not braided and those non-braided reaches may be due to the close proximity of the channel characteristics to a meandering stream, or it may be due to local geologic controls and/or riparian vegetation, or a combination of the above factors. During flood discharges, the channel braids are submerged and the river behaves as a straight planform river.

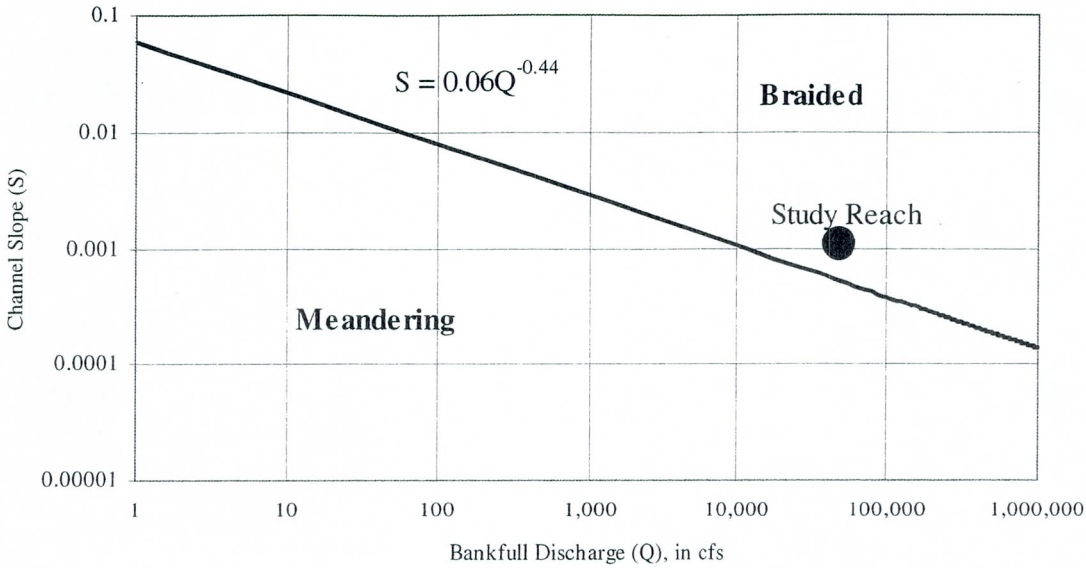


Figure 14. Leopold and Wolman's (1957) relationship between channel slope, bankfull discharge and channel patterns.

Bankfull Discharge

Dunne and Leopold (1978) define bankfull discharge as "the discharge at which channel maintenance is most effective, that is the discharge at which moving sediment, forming or removing bars, forming of changing bends and meanders and generally doing the work that results in the average morphological characteristics of channels." Wolman and Miller (1960) define bankfull discharge as the discharge that represents the lower range of channel forming flows which transport the bulk of the available sediment over time and thereby defines channel geometry.

Some physical indicators for determining bankfull stage and therefore bankfull discharge cited by Rosgen (1996) are:

- the presence of a floodplain at the elevation of incipient flooding,
- the elevation associated with the highest depositional feature,
- a break in slope of the banks or a change in the particle size distribution, or
- evidence of an inundation feature such as a small bench.

Knowledge of the bankfull stage can be used with various procedures (rating curves, hydraulic calculations, etc.) to estimate the bankfull discharge. The return period for the bankfull discharge can be estimated from site-specific or regional flood frequency relations. The greater the number of identified indicators of bankfull discharge leads to a higher confidence level of estimating the bankfull discharge.

Bankfull discharge for the El Rio study reach was established utilizing the hydraulic model developed by Michael Baker, Jr. Inc. for the 100-year floodplain delineation. A multiple discharge model was developed using peak discharges for the 5-year, 10-year and 100-year events. Cross sections where then reviewed for bankfull stage indicators. Figures 15 through 27 display typical cross sections and bankfull stage indicators for the study reach. There is good agreement of the 10-year peak discharge water surface elevation and bankfull stage indicators. Those cross sections are examples of bankfull stage indicators. Not all of the cross sections in the hydraulic model depict conclusive indicators. In some, the height of depositional features and the height of adjacent floodplains is greater than the 10-year water surface elevation, possibly indicating a bankfull stage greater than the 10-year water surface elevation at specific locations. The 10-year peak discharge is chosen as the bankfull discharge for the study reach of the Gila River.

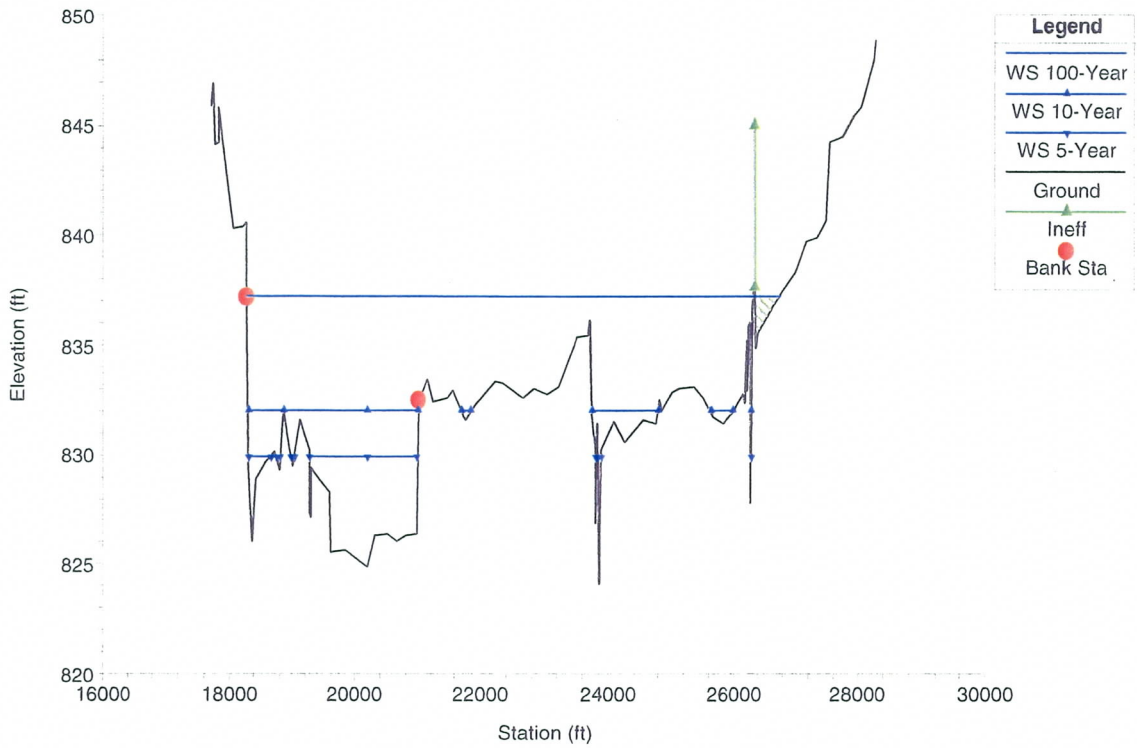


Figure 15. Gila River cross section at station 181.82 showing the 10-year water surface elevation is above depositional features in channel and just below right overbank deposits.

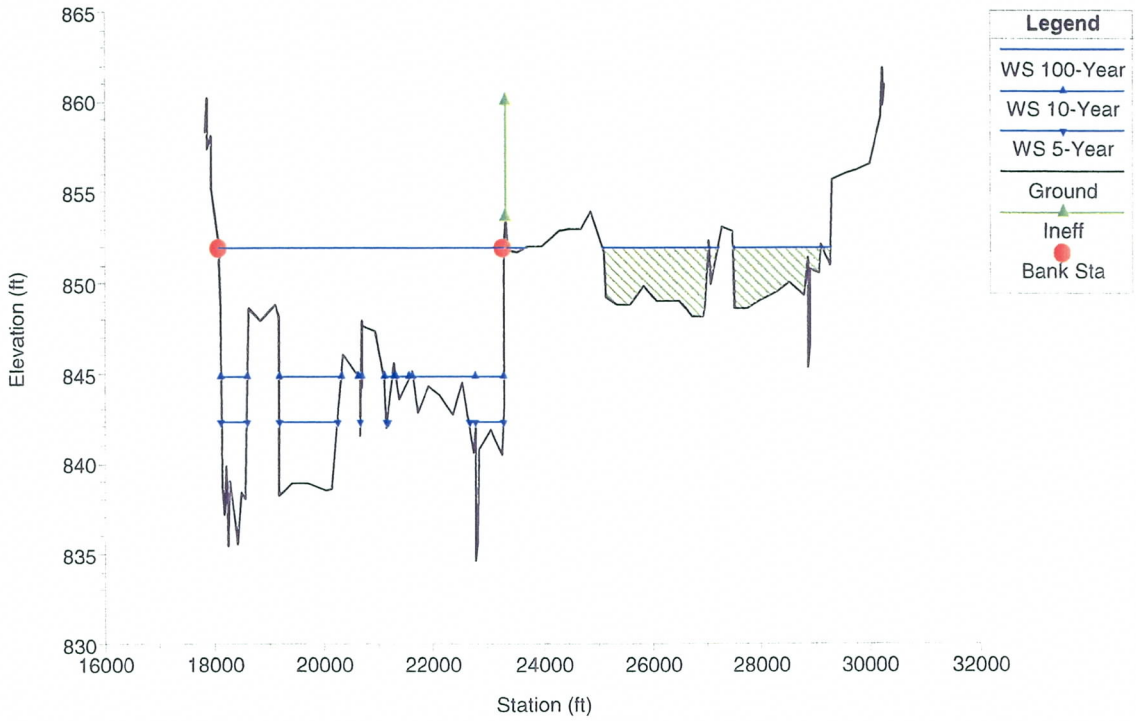


Figure 16. Gila River cross section at station 184.62, the 10-year water surface elevation is above some depositional features in channel and well below right overbank deposits.

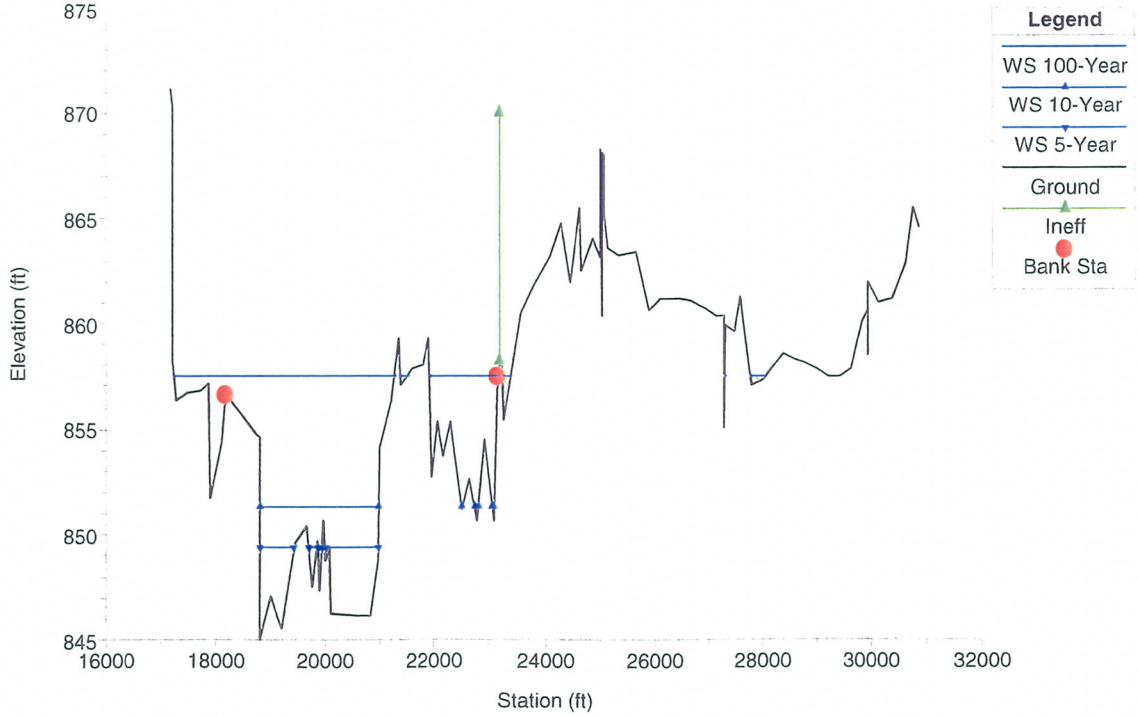


Figure 17. Gila River cross section at station 185.53 showing 10-year water surface elevation is above depositional features in channel and well below right overbank deposits.

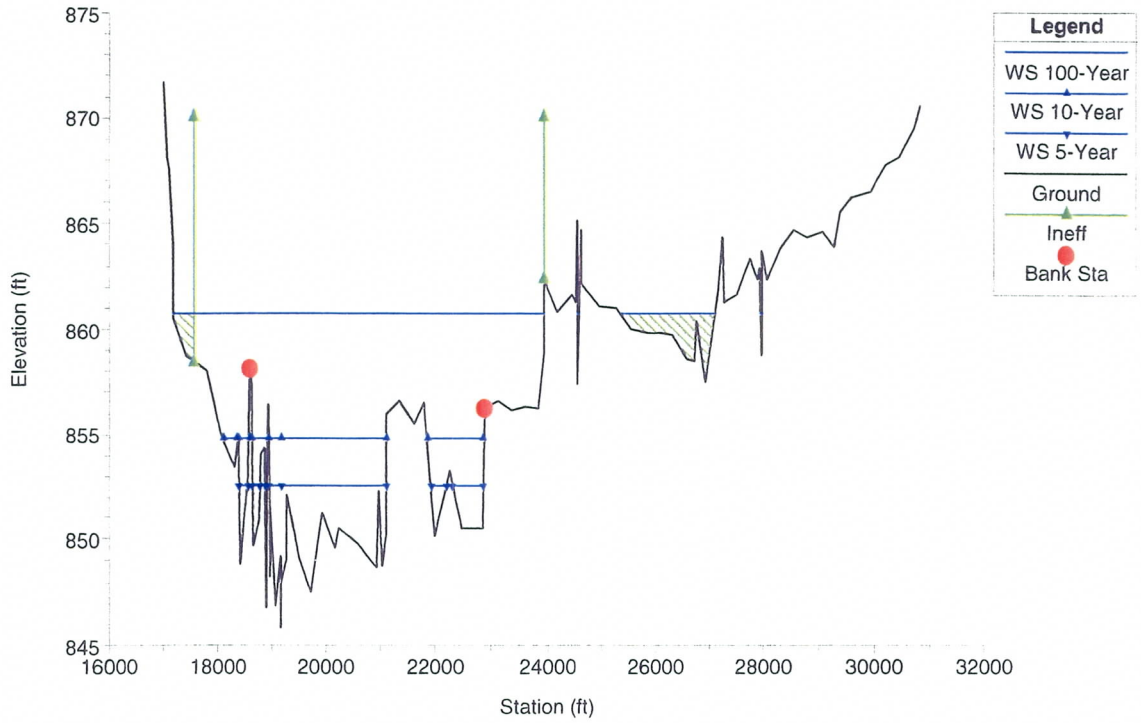


Figure 18. Gila River cross section at station 186.00 showing 10-year water surface elevation is above some depositional features in channel, below larger depositional channel features and below right overbank deposits.

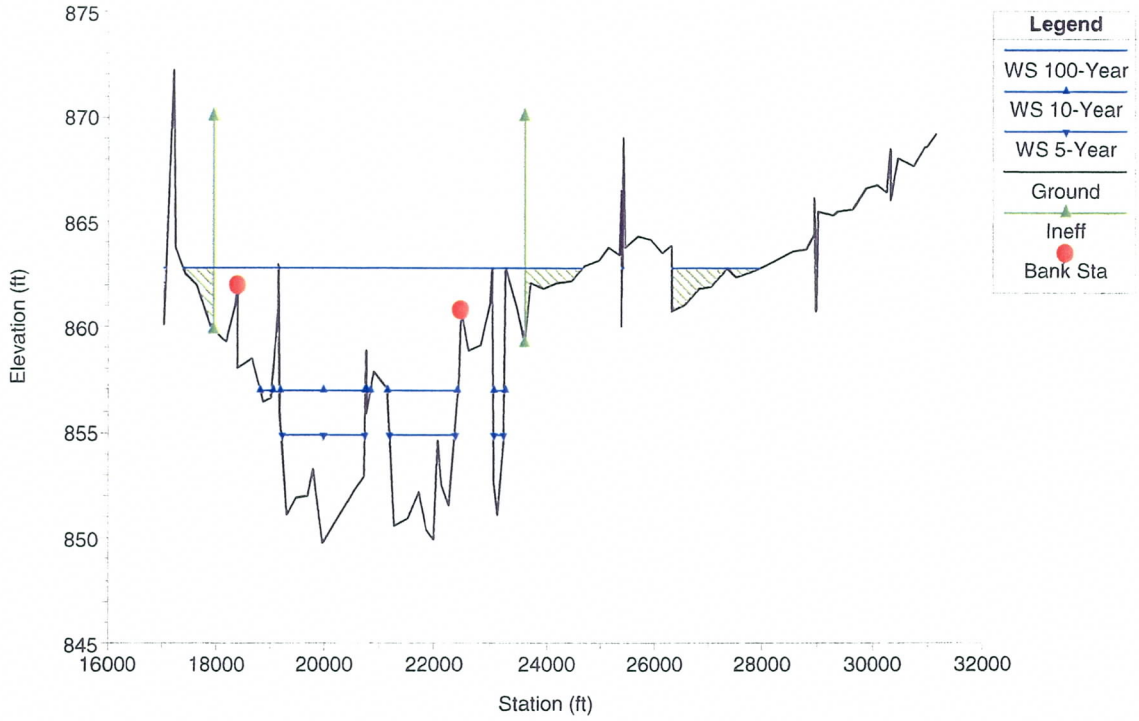


Figure 19. Gila River cross section at station 186.27 showing 10-year water surface elevation is just below larger depositional channel features and well below right overbank deposits.

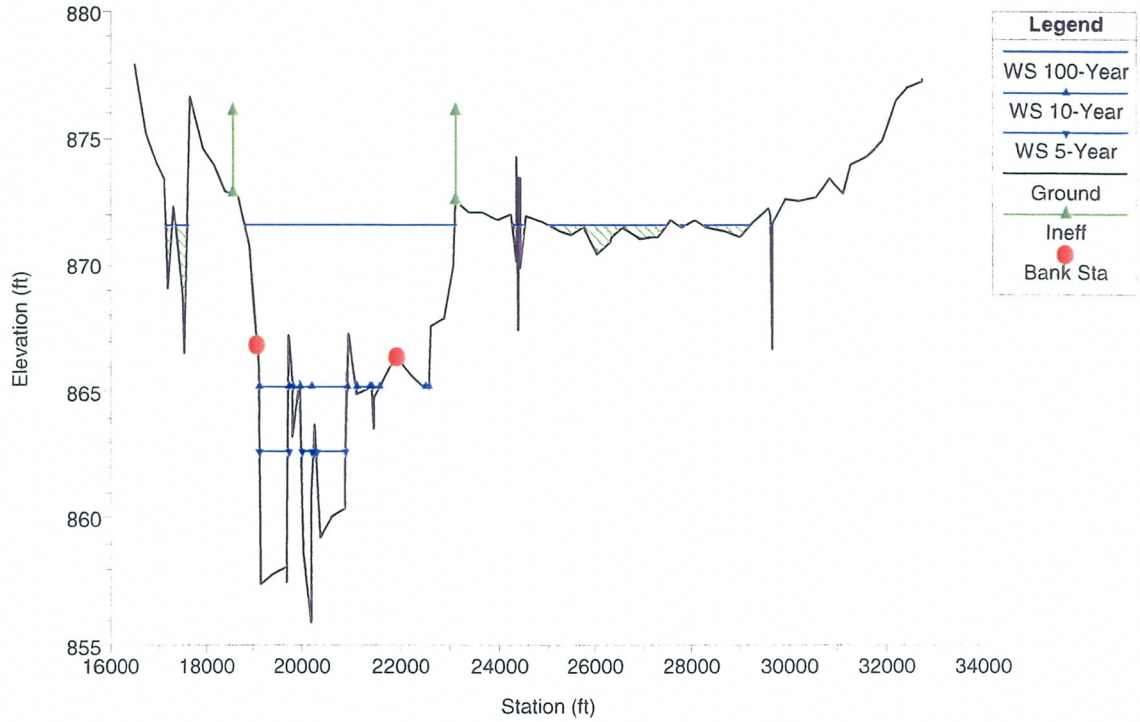


Figure 20. Gila River cross section at station 187.54 showing 10-year water surface elevation is above depositional features in channel and just below right overbank deposits.

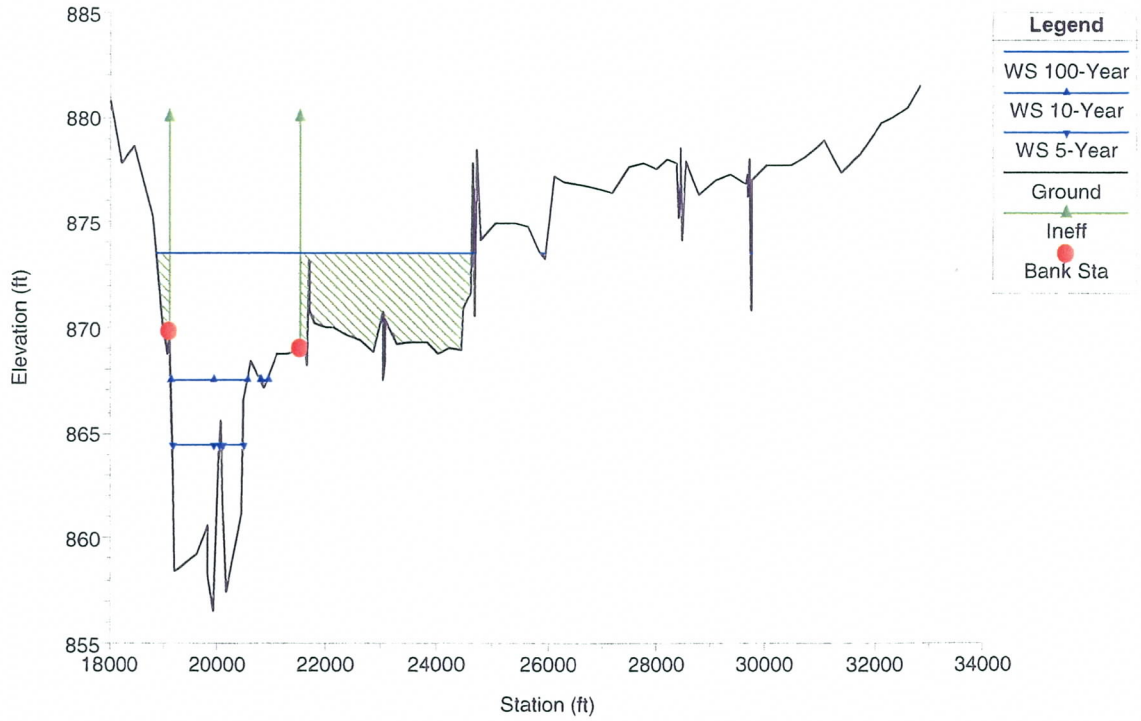


Figure 21. Gila River cross section at station 187.91 showing 10-year water surface elevation is above depositional features in channel and just below right overbank deposits.

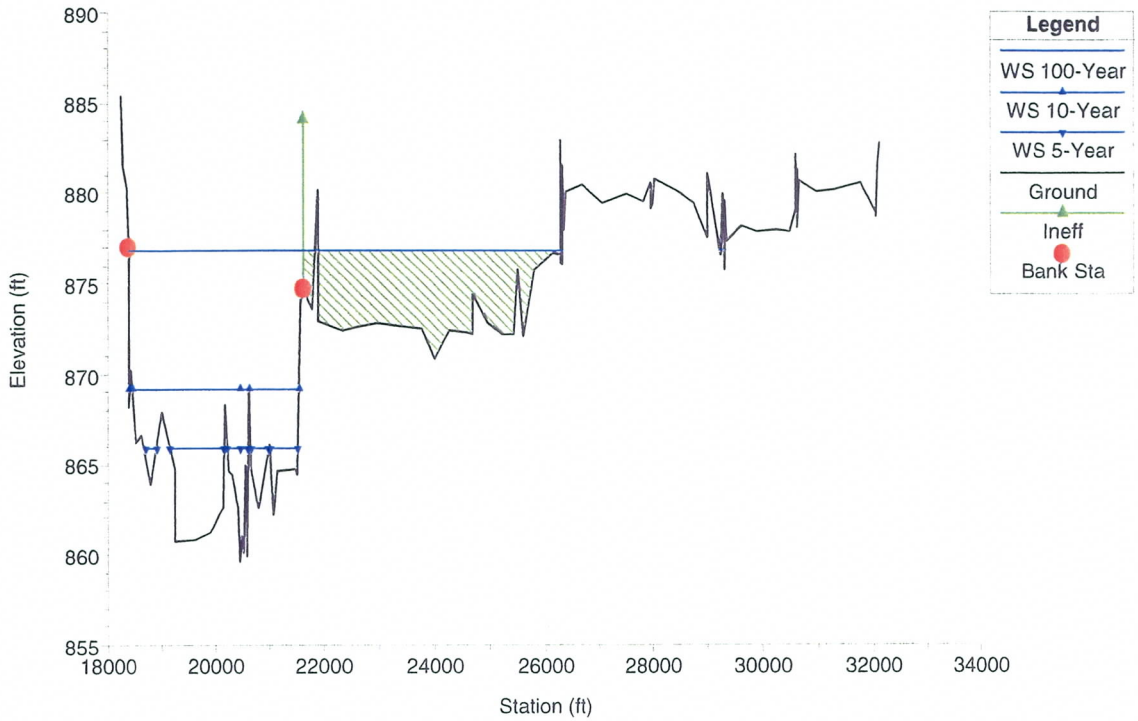


Figure 22. Gila River cross section at station 188.29 showing 10-year water surface elevation is above depositional features in channel and below right overbank deposits.

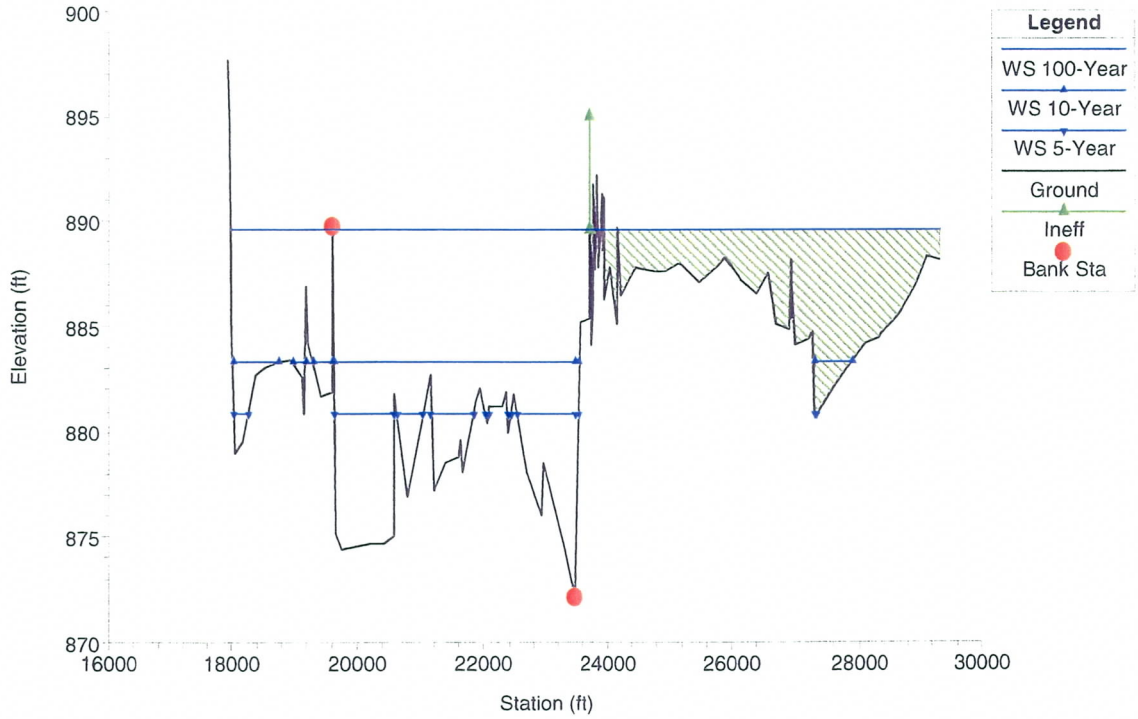


Figure 23. Gila River cross section at station 190.62 showing 10-year water surface elevation is above depositional features in channel and at left overbank deposits.

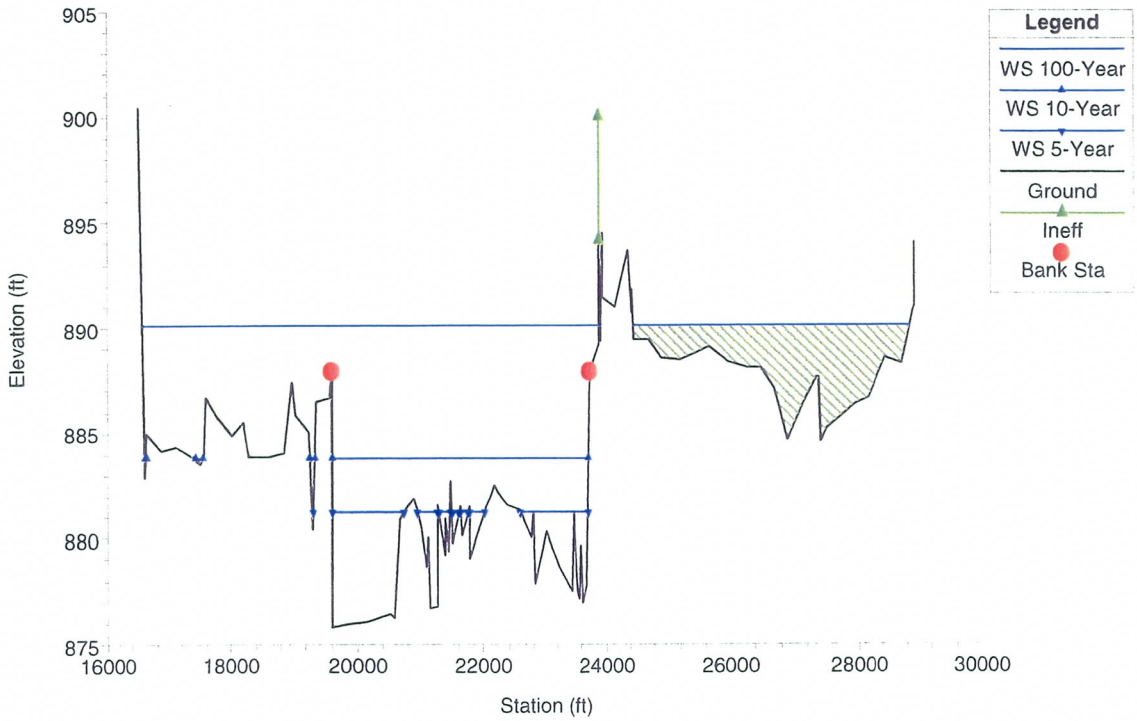


Figure 24. Gila River cross section at station 190.80 showing 10-year water surface elevation is above depositional features in channel and just below right overbank deposits.

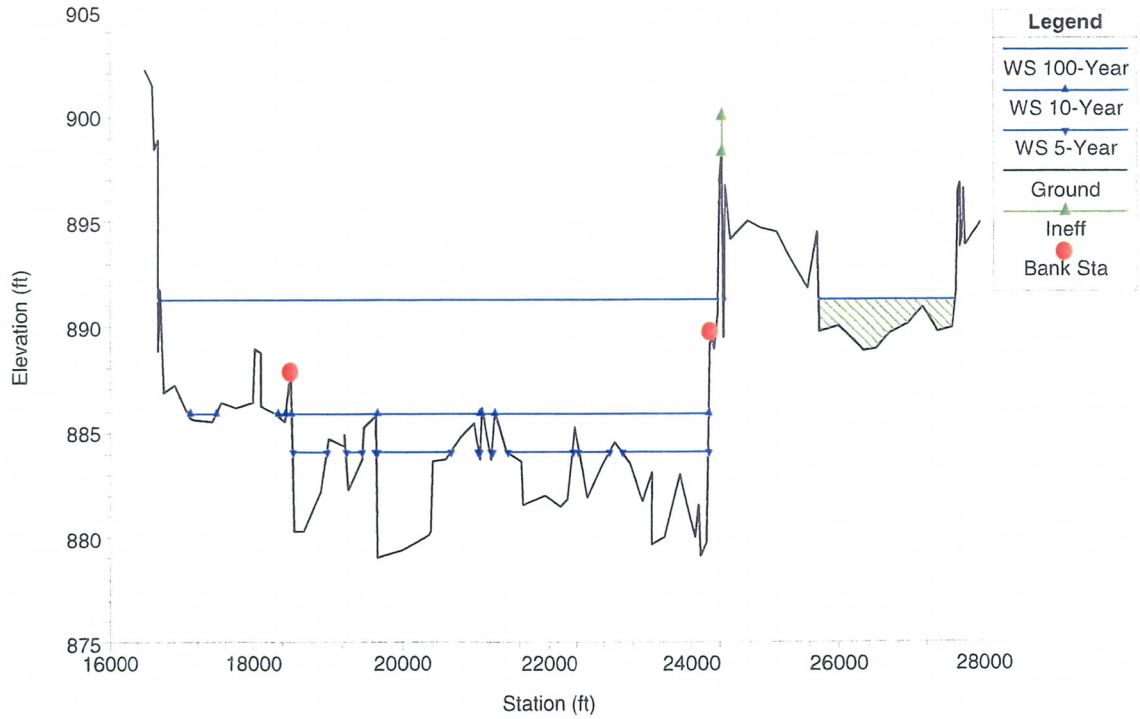


Figure 25. Gila River cross section at station 191.27 showing 10-year water surface elevation is above depositional features in channel and just below right overbank deposits.

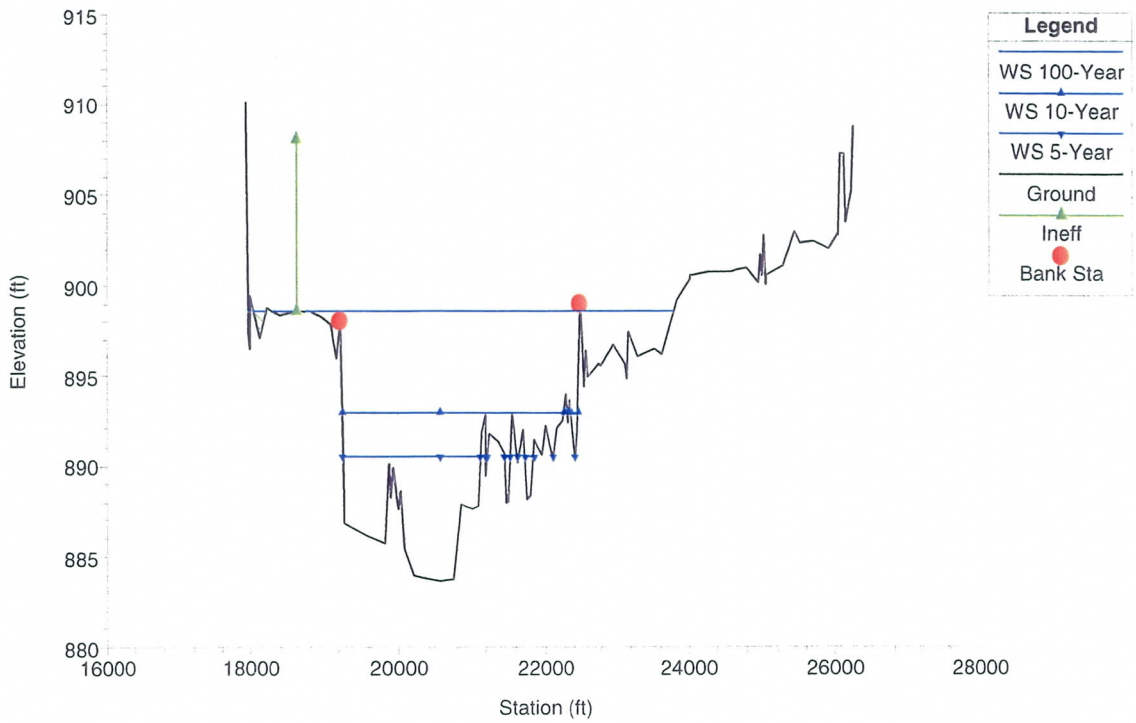


Figure 26. Gila River cross section at station 192.88 showing 10-year water surface elevation is above depositional features in channel and below right and left overbank deposits.

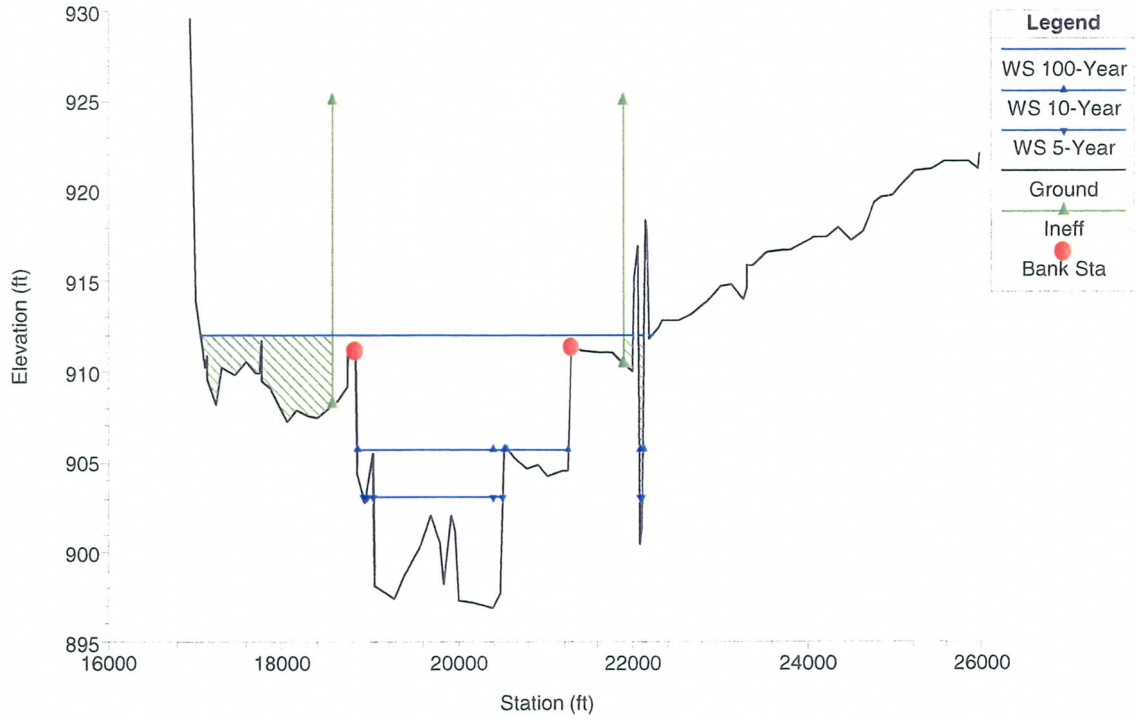


Figure 27. Gila River cross section at station 194.91 showing 10-year water surface elevation is above depositional features in channel and just above right overbank deposits.

Channel Sinuosity

Sinuosity is the ratio of stream length to valley length and is related to channel meander geometry. The degree of channel sinuosity is used to distinguish one channel type from another. Sinuosity for the Gila River in the study reach was estimated utilizing the flow path for the 10-year (stream length) and the length of the study reach (valley length). The sinuosity of the study reach of the Gila River ranges from near 1.0 to 1.1. The sinuosity for the Gila River is considered very low, indicating a tendency for the river to be either straight or braided channel, rather than meandering.

Width-to-Depth Ratio

Rosgen (1996) defines the width-to-depth ratio as the ratio of the bankfull water surface width to the mean depth of the bankfull channel. The width-to-depth ratio is an indicator of channel instability trends. The greater the width-to-depth ratio the greater the hydraulic stress against the banks resulting in accelerated bank erosion (Rosgen, 1966). The width-to-depth ratio for the study reach of the Gila River ranges from 546 to 1,031. The Gila River has lateral instability indicating a tendency for bank erosion during high discharges.

Rosgen (1996) utilizes an entrenchment ratio to quantify the vertical containment of the river. The entrenchment ratio is the ratio of the width of the floodprone area to the width of the bankfull channel. The floodprone area is defined at a stage elevation of twice the bankfull depth. The hydraulic depths for the 100-year peak discharge for the study area are approximately twice the bankfull depth. A low ratio (1.0 to 1.4 +/- 0.2) is an indicator of a high degree of entrenchment whereas a ratio of 2.2 or greater is an indicator of low or slightly entrenched. The ratio of the width of the 100-year floodplain to the width of the bankfull channel was utilized to estimate the entrenchment ratio for the study reach of Gila River. The entrenchment ratio for the study reach of the Gila River ranges from 1.7 to 3.5. The Gila River has a rather high entrenchment ratio indicating a tendency for bank erosion as opposed to channel incisement.

FLUVIAL GEOMORPHOLOGY

Channel Section Geometry

Figures 15 through 27 depict bar island and channel configurations that are typical of the study reach. The dimensions of the bar and island features are variable and can be as great as a 1,000 feet horizontally and 5 to 10 feet vertically in section.

Comparison of cross sections within the study reach taken at or near the same location in 1984 and in 1993 indicate that there was significant change to the channel morphology as a result of the large flood in January through April 1993. The comparison shows that channels were filled in, new bars were formed and channel bars/islands were eroded away giving way to new channels. Figures 28 and 29 are plots of cross sections from the study reach of the Gila River at different times.

Those two figures illustrate the dynamic nature of the Gila River and the magnitude of the lateral and vertical changes in river cross section geometry that can occur with a flood.

Figure 28
Gila River cross section at station 189.49 (1984 and 1993)

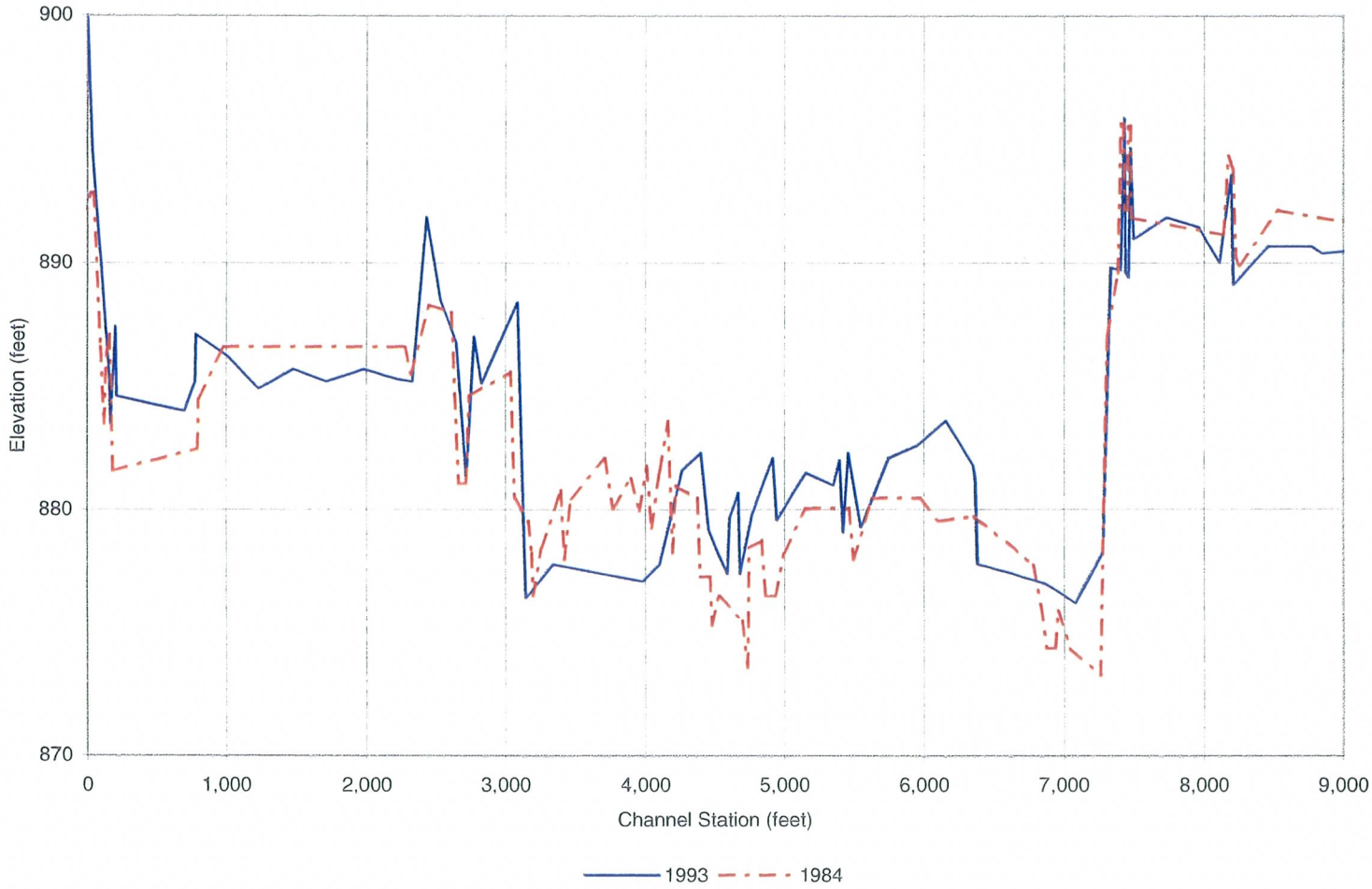
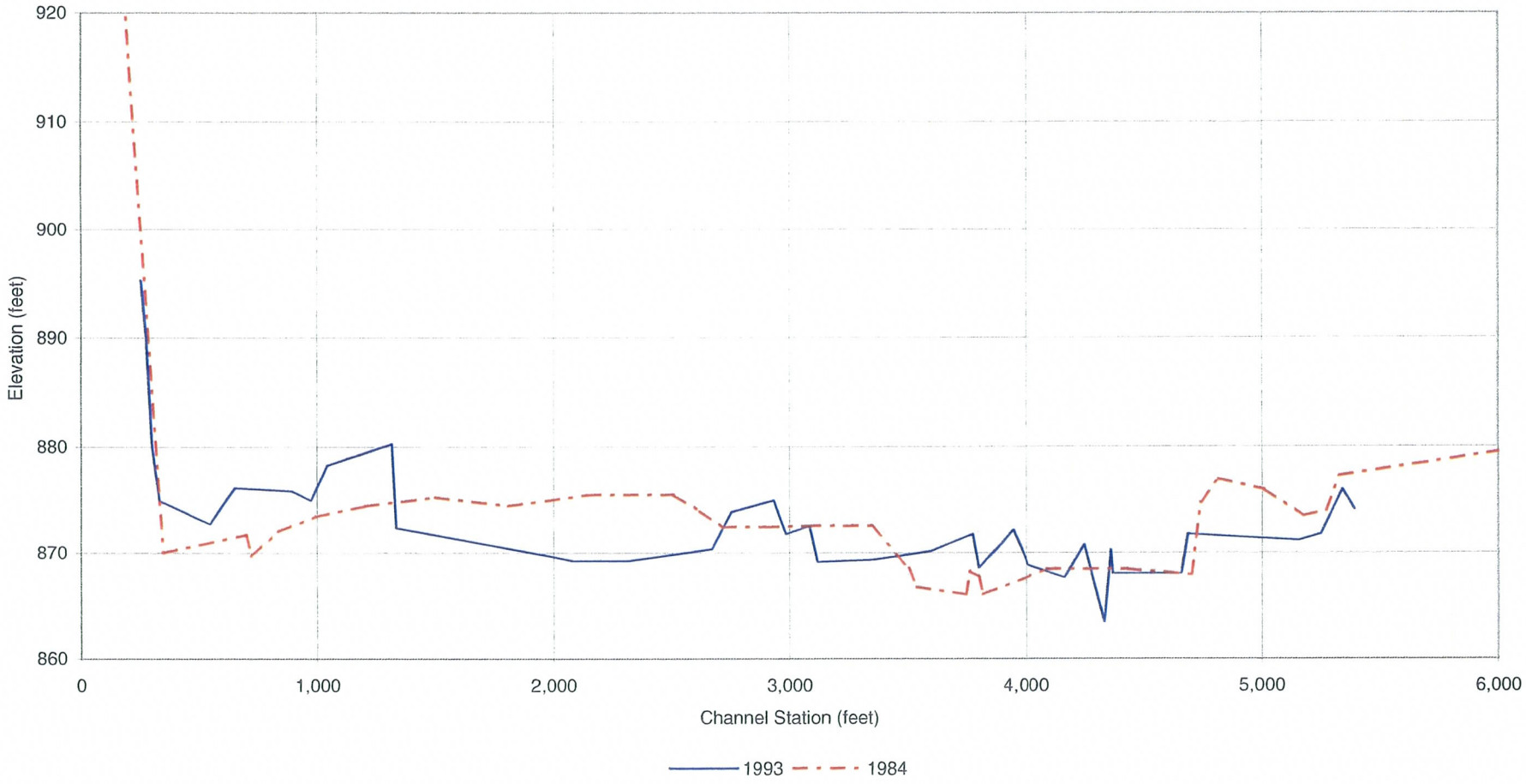


Figure 29
Gila River cross section at station 190.89 (1984 and 1993)



MORPHOLOGY PROCESS

Based on the morphological characteristics of the study reach of the Gila River, inferences are made as to the process that formed that reach of the Gila River. Those characteristics indicate that the Gila River is best described by the following excerpt from Thorne (1997) based on Leopold and Wolman's 1969 laboratory study as:

> "In a channel with abundant bedload, deposition of a mid-channel bar deflects the flow first to one side and then the other, to attack and erode the banks. The resulting bank retreat feeds sediment to the channel, supporting further bar growth. It also produces a lenticular planform shape to the channel that creates space for lateral expansion of the mid-channel bar. As the bar grows and the banks retreat, the subchannels on either side of the bar become increasingly curved, inducing strong secondary currents. The curved flow scours the bed and further erodes the banks at the outer margins of the channel while driving bed deposition along the inner margins of the anabranches. Bed scour in the divided reach lowers the water surface elevation so the top of the mid-channel bar emerges as an island. Through time, a bar–island complex develops, with multiple flow divisions and subchannels. Eventually, as the width increases, the bar-island complex may coalesce to form a much larger, semi permanent island. Mid-channel bar formation in each of the anabranch channels on either side of the island may then lead to further braiding through division of the flow following the same sequence of events."

Characteristics from Aerial Photography

Aerial photography from different time periods was reviewed to identify channel pattern characteristics and changes to channel patterns over time. Aerial photography from 1949, 1980 and 1993 was utilized (Attachment 2). The 1949 aerial photography was taken during a sustained drought (see Figures 8, 9 and 10). Prior to the 1949 photographs, the discharge had not exceeded 2,530 cfs dating back to 1941. The 1980 aerial photography was taken after the largest recorded peak discharge of 178,000 cfs on the Gila River (see Figure 8). The 1993 aerial photography was taken during the receding limb of the 1993 runoff event that had a peak discharge of 132,000 cfs and the largest measured runoff volume of record (see Figure 9).

Review of the aerial photographs indicates that the El Rio study reach is characterized by a corridor defined by multiple channels, bars and/or islands with the position of the channels and bars changing with time. The corridor is generally defined on the north by agricultural limits, and on the south by geologic features. Vegetation within the corridor is primarily confined to the channel and areas immediately adjacent to the channel in the 1949 photograph. In the 1980 and 1993 aerials, vegetation is denser outside the channel boundaries. During both the 1980 and 1993 floods, much of the riparian vegetation was removed during the flood. Vegetation was cleared from a 1,000-foot wide corridor by the FCDMC during 1980 through 1992 and some remnants of the clearing are evident in the 1993 photos. For areas outside of channels, but within the corridor, vegetation density generally increased with time; this is particularly true for the area between 211th Avenue

and SR 85. Field observations show that the vegetation type in the areas of dense vegetation is tamarisk (salt cedar), a non-native species.

CHANNEL CLASSIFICATION

Channel classifications are used to group rivers that display similar patterns and morphologies. Channel classification can be used to infer the process that formed the river being studied. Channel classifications that are used for the characterization of the study reach of the Gila River are those of Schumm (1977, 1981) and Rosgen (1996).

Schumm's classification for alluvial channels is based on pattern type and sediment load. Pattern type (straight, meandering, braided) at a constant discharge is a function of the type, size and quantity of the sediment load that the channel is transporting, and the channel slope and width-to-depth ratio. Figure 30 depicts the Schumm channel classification scheme.

Some physical channel characteristics of the study reach of the Gila River are:

- it is a predominantly sand bed channel,
- the slope of the channel is relatively steep (approximately 6 feet per mile),
- the width to depth ratio is greater than 40,
- high sediment transport rates are observed during floods and
- the river is braided at low to moderate discharges (less than about the 10-year discharge) and progressively straighter with larger discharges.

Based on Schumm's channel classification (Figure 30), the study reach of the Gila River fits the categories shown in the lower portion of the third column, that is, a braided, sand bed channel with low relative stability.

Based on Rosgen (1996) using morphological characteristics, the study reach of the Gila River is a D5, as shown in Figure 31. Characteristics of D5 are sand bed, multiple channels, very low sinuosity (less than 1.2) and very high width-to-depth ratios (greater than 40). Other features of a D-type channel are active lateral adjustment with abundant sediment supply, high bed load transport and bank erosion.

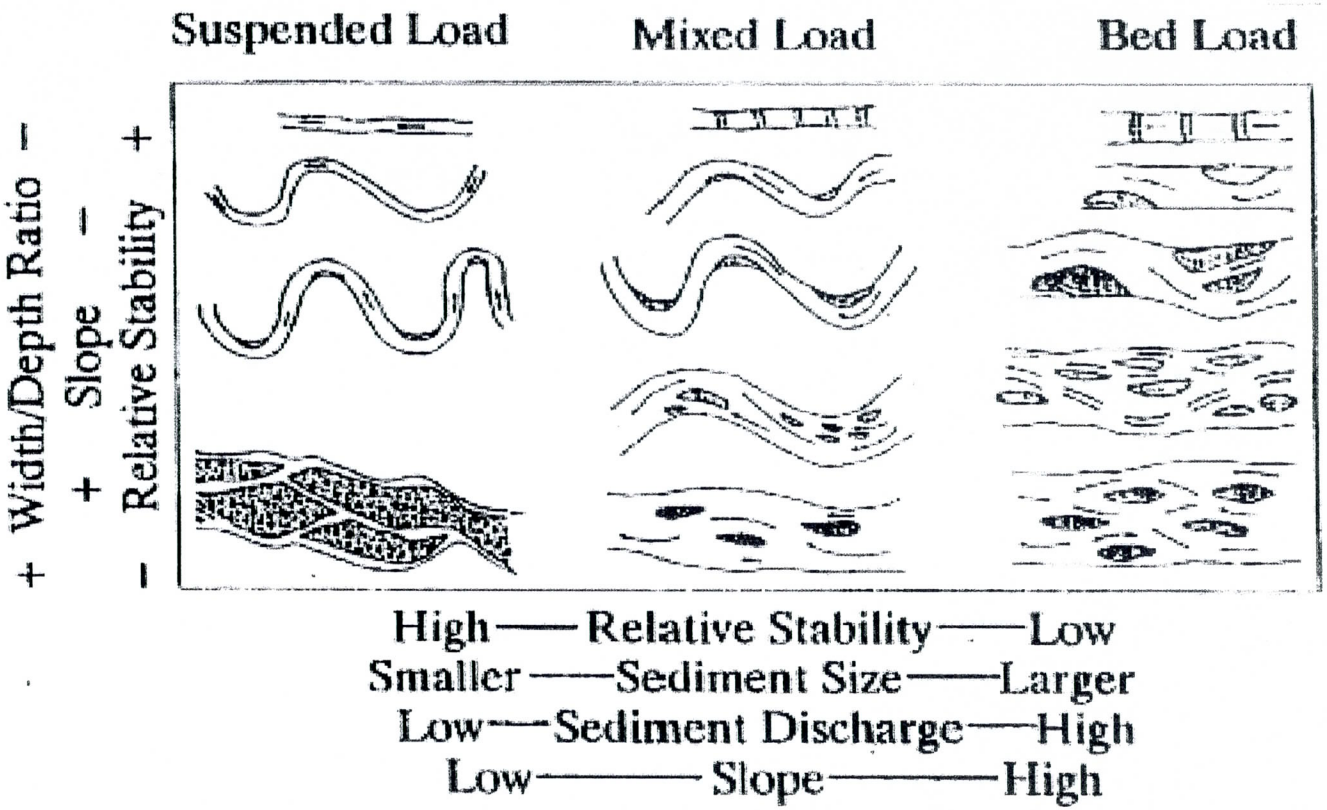


Figure 30. Channel Classification after Schumm (1981)

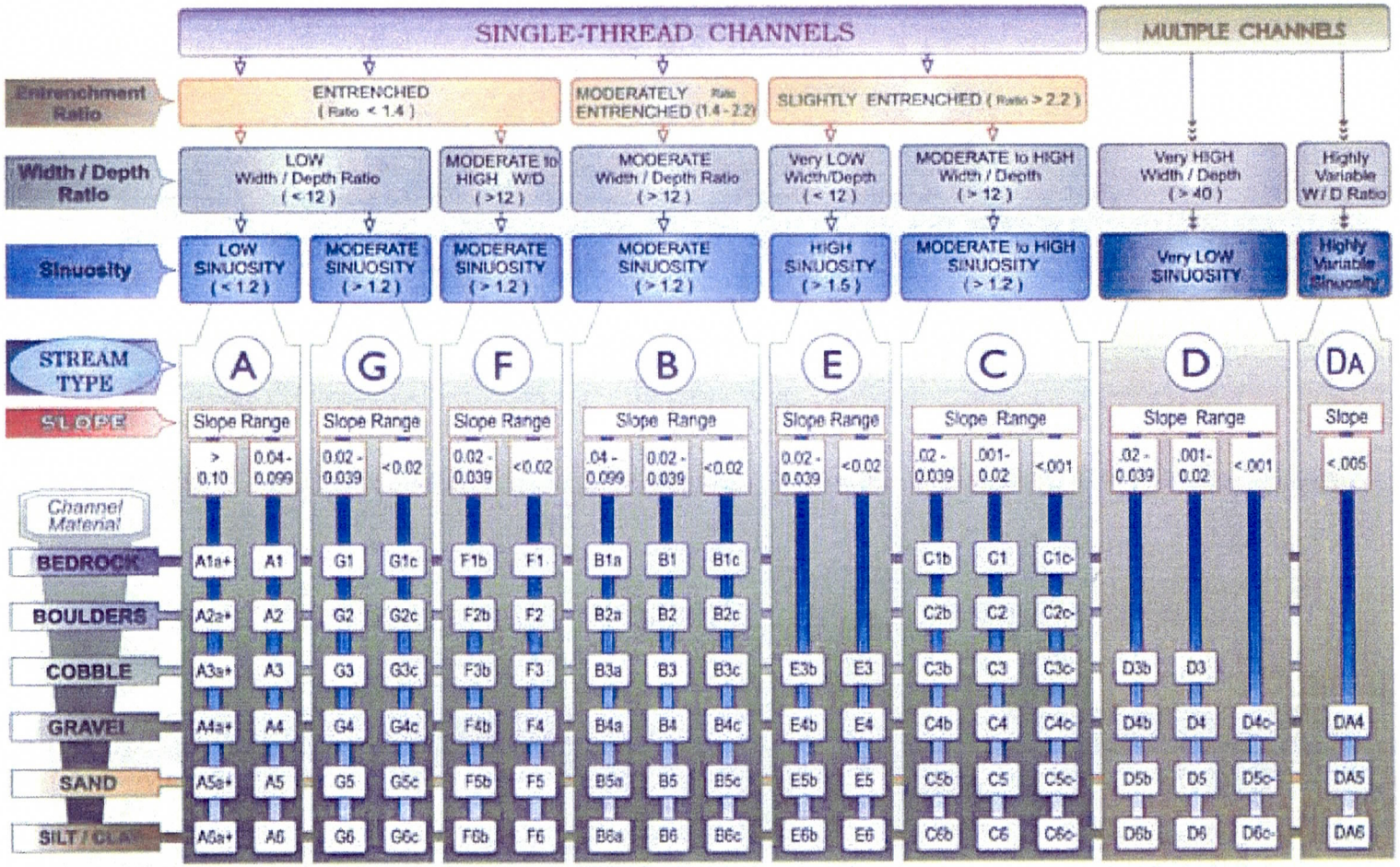


Figure 31. Rosgen (1996) Channel Classification Scheme

Summary of Geomorphic Characteristics

1. The Gila River in the El Rio study area has the following general characteristics:

    - Channel slope is approximately 6 ft/mile,
    - Bankfull width averages 3,600 feet and ranges from 1,500 to 8,700 feet,
    - 100-year floodplain width averages 7,800 feet and ranges from 2,000 to 12,500 feet,
    - The hydraulic depth at bankfull discharge averages 4.7 feet and ranges from 3 to 10 feet,
    - The hydraulic depth at the 100-year discharge averages 9.9 feet and ranges from 6 to 16 feet,
    - The channel sinuosity ranges from near 1.0 to 1.1.

2. The bed of the Gila River in the study reach is composed of sand with gravel and some cobble.

3. The channel classification according to Schumm (1981) is braided.

4. The channel classification according to Rosgen (1996) is D5 with characteristics of braided, high sediment transport, bank erosion and active lateral adjustment.

5. The Gila River tends to be laterally unstable with highly erodible banks.

6. Adjustments of the river to floods will generally be laterally (bank erosion and lateral migration) as opposed to vertically (channel incision).

SEDIMENT DATA

GENERAL

The sediment data that is input to HEC-6T is of two types; inflowing sediment and bed material size gradation. Inflowing sediment is a boundary condition; that is, it provides information as to the quantity and size distribution of sediment that enters the study area during floods. Since hydrologic input is for both the Gila and Salt Rivers above the confluence, two sediment inflow curves are needed, one for the Gila River and another for the Salt River.

Bed material size gradation data provides information about the size of the particles in the bed of the Gila River in the study area. That information is provided as percent, by weight, of size fractions of particles making up the bed of the river. The size gradation was determined by performing laboratory sieve analyses of bed material samples that were obtained at various locations in the river. The bed of the Gila River is predominantly sand with a small portion of gravel.

INFLOWING SEDIMENT

Inflowing sediment is fluvial sediment that enters a reach of river, either as suspended load or bed load, through the most upstream cross section of the river and through tributaries that enter the river. For the El Rio HEC-6T model, that inflow occurs from the Gila River and from the Salt River upstream of the confluence of those rivers. Due to the proximity of the Agua Fria River to the upper boundary of the model, the hydrologic input to the model from Agua Fria River inflow is incorporated into the Salt River sediment inflow. Since hydrologic inflow from Waterman Wash is not included in the model due to its minor contribution to flood discharge, sediment inflow from that tributary is similarly not included into the model.

The determination of sediment inflow to the El Rio study area is complicated by the following factors:

1. Sediment inflow is needed for both the Gila River and the Salt River upstream of the confluence.

2. There is no systematic source of sediment data for the El Rio study reach of river.

3. The nearest sediment sampling is that of the USGS at its gaging station for the Gila River downstream of Gillespie Dam, about 11 miles downstream of SR 85. That sampling station reports the combined inflow of the Gila and Salt Rivers.

4. Sediment influx varies for each flood depending to a large degree on the source of the runoff and the intensity of the runoff producing event. For example, sediment production is greater from an intense storm flood rather than from a snowmelt flood.

5. Sediment influx varies temporarily during a flood. Typically a flood has greater sediment concentrations on the rising stage of a flood as opposed to the falling stage of a flood.

Inflowing sediment is input to HEC-6T by sediment rating curves; that is, a graphical relation of sediment load, in tons per day, as a function of streamflow, in cfs. Also associated with the rating curve is a table that relates the percentage of each grain size class of inflowing sediment.

An inflowing sediment rating curve was developed using USGS data that was collected for the Gila River at Gillespie Dam. The data was sorted for discharges greater than 500 cfs. Sediment data for the flood of 1993 plus a few more current measurements were used due to the availability of sediment data for flood discharges during that time period. The rating curve was developed by the method of group-average, wherein the sediment loads and corresponding water discharges are averaged. In this case, the four largest discharge samples were averaged to give the coordinates of the rating curve at the high end, and the four smallest discharge samples were averaged to give the coordinates of the rating curve at the low end. The USGS and group-average results are shown in Table 8.

Table 8

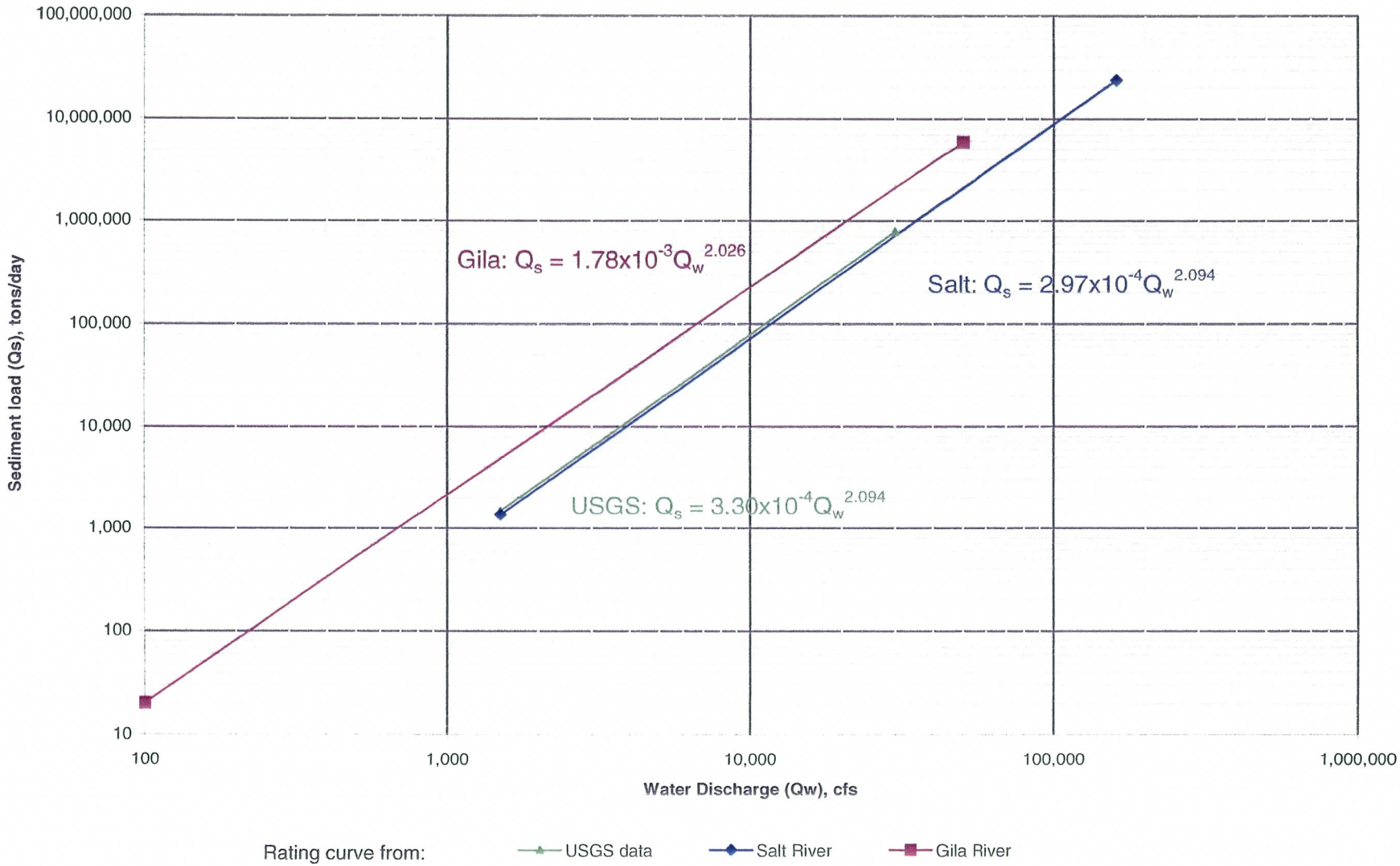
Sediment Discharge Data and Sediment Rating Curve

Date	Water Discharge Cfs	Sediment Discharge tons/day	Group-Averages		
			Water Discharge Cfs	Sediment Discharge tons/day	Concentration ppm
01-12-93	65,000	2,630,000	30,025	784,625	9,700
02-17-95	23,800	129,000			
03-03-93	21,000	286,000			
03-30-93	10,300	93,500			
05-27-93	3,450	4,830	1,518	1,482	360
05-07-93	1,500	960			
11-19-93	610	92			
03-24-94	514	44			

The rating curve from the data of Table H is shown in Figure 32. The data to develop that rating curve includes additional sediment that was entrained in the flow due to the breach of Gillespie Dam. The breach of the dam resulted in the release of about 10 percent additional sediment in 1993 than the natural sediment load. Due to that, the rating curve of Figure 32 is reduced by 10 percent as shown in that figure. For the HEC-6T model, that rating curve is used for the inflow from the Salt River since that river produces the majority of the runoff through the study area.

The sediment rating curve of Figure 32 provides the method by which the HEC-6T program calculates the total sediment load as a function of water discharge. The size distribution of the sediment from the Salt River is shown in Table 9. That size distribution was determined by inspection of USGS sediment measurement data. It is

Figure 32
HEC-6T Incoming Total Sediment Rating Curves



estimated that 90 percent of the incoming sediment is wash load; 60 percent being clay and 30 percent being silt. Of the total sediment load, about 10 percent is bed material load; 9 percent being sand and 1 percent being very fine gravel. These percentages are general averages based on review of regional data, information from other projects in the area, field observation and general relations for similar alluvial rivers.

Table 9

Size distribution of incoming sediment for the Salt River

Classification	Percent Finer	Fraction of Total Load	Largest Size in Classification mm
Clay	60.0	60.0	0.004
Very Fine Silt	67.5	7.5	0.008
Fine Silt	75.0	7.5	0.016
Medium Silt	82.5	7.5	0.032
Coarse Silt	90.0	7.5	0.0625
Very Fine Sand	92.0	2.0	0.125
Fine Sand	94.0	2.0	0.25
Medium Sand	96.0	2.0	0.5
Coarse Sand	98.0	2.0	1
Very Coarse Sand	99.0	1.0	2
Very Fine Gravel	100.0	1.0	4

The sediment rating curve for the Gila River inflow was developed by adjusting the Salt River sediment rating curve. The following adjustments were made to the Salt River sediment rating curve:

- The concentration of total sediment load for the Salt River at 130,000 cfs was set equal to the concentration of the Gila River at 50,000 cfs.
- The portion of bed material load for the Gila River was increased to 20 percent of the total sediment load.
- The largest size fraction of incoming sediment for the Gila River is very coarse sand (1.0 mm to 2.0mm) rather than very fine gravel as in the Salt River.

Specific data is not available for the Gila River upstream of the confluence with the Salt River; although regional data and field observations indicate that the bed material of the Gila River upstream of the confluence is predominantly sand and is finer than the bed material of the Salt River upstream of the confluence. Therefore, the bed material load of the Gila River will be greater than that of the Salt River. Furthermore, the Salt River has numerous large storage dams upstream of the study area whereas the only significant storage dam upstream on the Gila River is San Carlos Dam. Therefore, the Gila River will contribute a higher concentration of wash load than the Salt River. The verification results that are presented later in this report support these assumptions.

The incoming sediment load rating curves for the Gila and Salt Rivers are shown in Figure 32. The size distribution of incoming sediment for the Gila River is shown in Table 10. The size distribution of incoming sediment for both the Gila and Salt Rivers is shown in Figure 33.

Table 10

Size distribution of incoming sediment for the Gila River

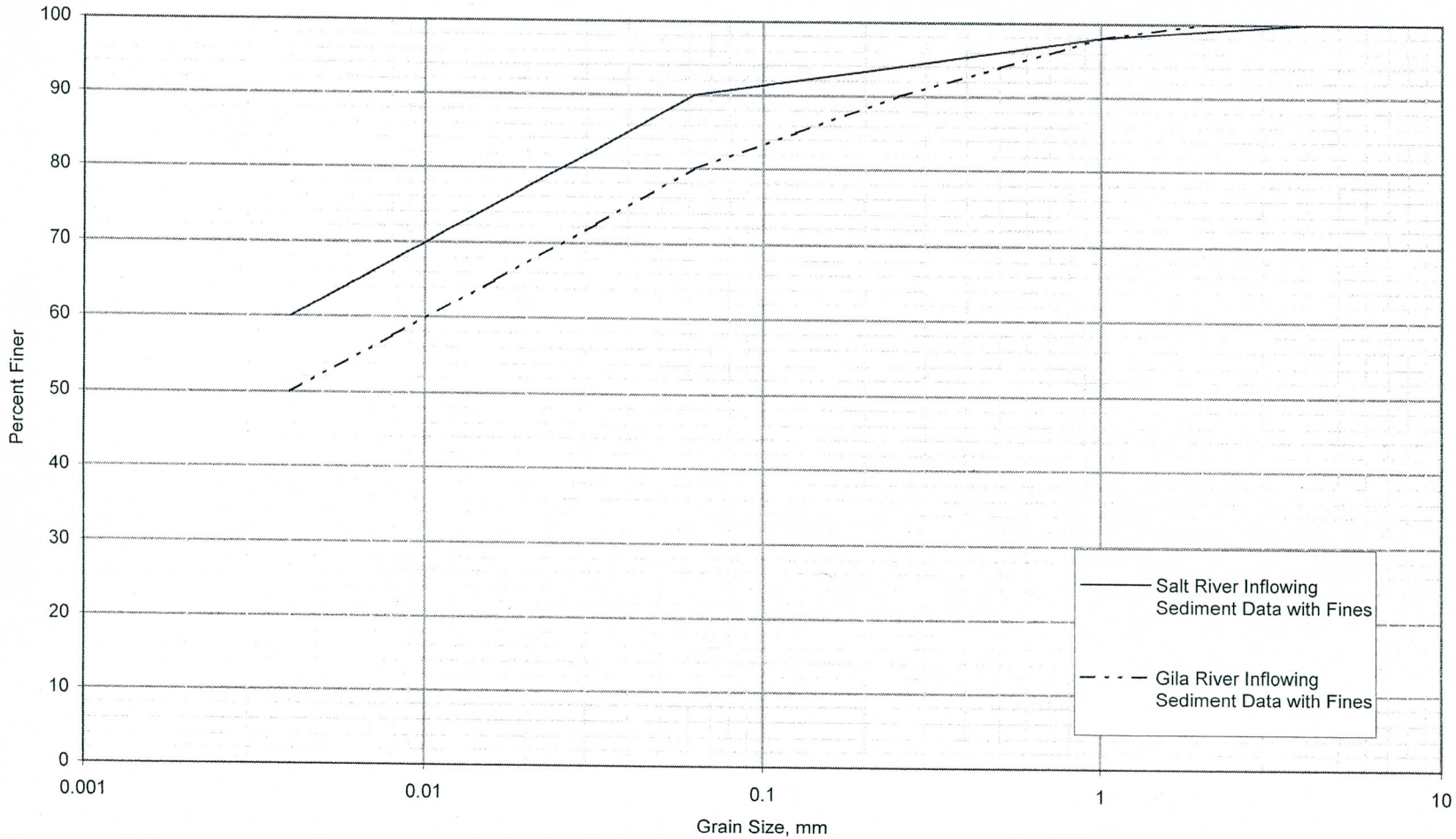
Classification	Percent Finer	Fraction of Total Load	Largest Size in Classification mm
Clay	50.0	50.0	0.004
Very Fine Silt	57.5	7.5	0.008
Fine Silt	65.0	7.5	0.016
Medium Silt	72.5	7.5	0.032
Coarse Silt	80.0	7.5	0.0625
Very Fine Sand	85.0	5.0	0.125
Fine Sand	90.0	5.0	0.25
Medium Sand	94.0	4.0	0.5
Coarse Sand	98.0	4.0	1
Very Coarse Sand	100.0	2.0	2

BED MATERIAL

Bed material size gradation is needed for sediment transport calculations within HEC-6T. Twelve bed material samples were obtained during the field visits; 11 of those 12 were from the bed of the river channel. Sample 6 was obtained from the vegetated overbank area. Size gradation was obtained by sieve analysis and the results are shown graphically in Figure 34. The bed material is predominantly sand and the field observations are described in the Data Collection section. Large areas of the river bed are covered by a veneer of gravel and some cobble. That veneer is typically one grain thick. Inspection holes dug in those gravel stringers confirmed that the underlying bed material is consistent with the size gradations of Figure 34. Those gravel stringers give the river the impression of being a much coarser bed material river. The gravel stringers appear to be the result of localized hydraulic sorting. The grain size distribution of the bed material in such a gravel stringer was measured by performing a surface "pebble count." The result of the pebble count is shown in Figure 34.

Sample 6 is not used to estimate the grain size of the bed material. Rather, that sample is informative of the complex erosion and sedimentation process that occurs in the Gila River. That sample was obtained from a densely vegetated (by tamarisk) overbank area. By observation, that material is typical of the tamarisk covered overbank floodplain. The material is about 50 percent silt and clay with the remainder being mostly very fine and fine sand (0.062 to 0.25 mm). Only about 5 percent is medium sand (0.25 to 0.5 mm) with very little coarse sand. Therefore, most of the surface (maybe as much as the top 5 to 10 feet) of sediment in the tamarisk floodplain is wash load that has deposited on the floodplain. The deposition occurs during floods, probably larger than about 50,000 cfs, when significant flow overtops the channel banks and enters the floodplains. The dense

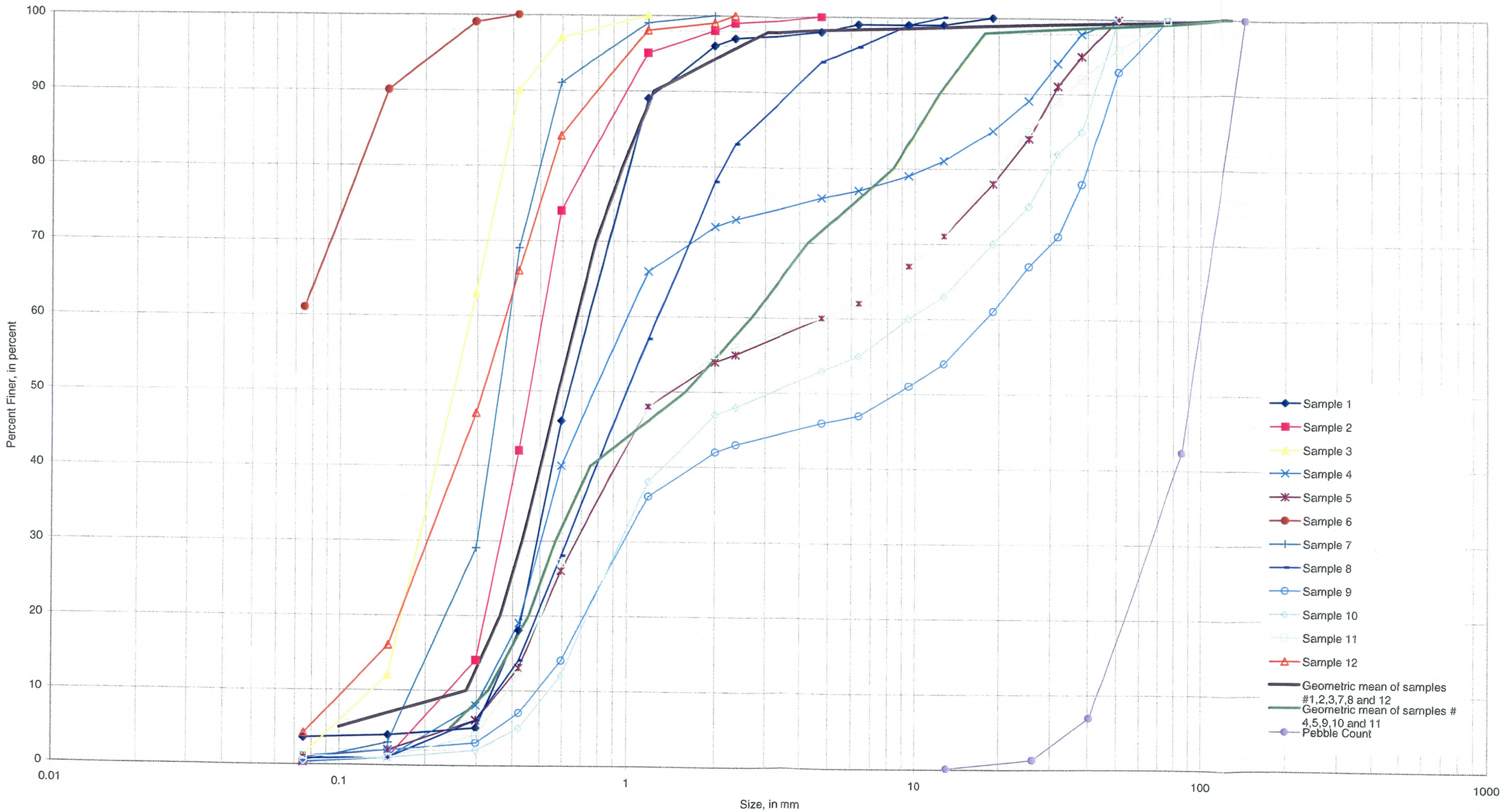
Figure 33
Inflowing Sediment Size Gradation Rating Curve



	VF	F	M	C	VF	F	M	C	VC	VF
Clays	Silts				Sands					Gravels

Where: VF - Very Fine, F - Fine, M - Medium, C - Coarse, VC - Very Coarse

Figure 34
Size Gradation of Samples from the El Rio study area of the Gila River



Very Fine Sand	Fine Sand	Medium Sand	Coarse Sand	Very Coarse Sand	Very Fine Gravel	Fine Gravel	Medium Gravel	Coarse Gravel	Very Coarse Gravel	Small Cobbles	Large Cobbles	Small Boulders

vegetation restricts the flow causing the velocity to diminish to 1 or 2 ft/sec. Deposition of fine sand and some of the wash load (silt and clay) occurs as evidenced by sample 6 and by field observation. Little, if any, of the coarser bed material can be coveyed any distance once the flow has overtopped the river banks and has entered the slower flowing floodplain. The consequence of this observation is that the tamarisk covered floodplains are likely to be deposition zones of fine material – mainly wash load.

The 11 bed material samples from the river channel are in two groups. Samples 1, 2, 3, 7, 8 and 12 are from the lower portion of the river while samples 4, 5, 9, 10 and 11 are from the upper portion of the river. The majority of the bed material that enters the study area comes from the Gila River and Salt River upstream of the confluence of those rivers. The Gila River is a predominantly sand bed river and as such, the upper Gila River delivers mostly sand to the study area. The Salt River, however, has a much greater portion of coarser sand, gravel and cobble as bed material. The coarser bed material is naturally occurring due to the river's steep gradient and close proximity to its source of coarse material, but the coarse bed material is probably exacerbated by sand and gravel mining and channelization in the Salt River through the Phoenix and Tempe metropolitan areas. Much of the sand probably was hydraulically (and mechanically) sorted out of the river bed material leaving a coarser fraction of material.

It appears that bed material of the Gila River downstream of the confluence undergoes a transition of the mixed inflow of coarser bed material from the Salt River and the sand bed material of the Gila River. Therefore, based on these observations and data collection, the study area was divided into three zones of bed material. The lowest zone, from river station (RS) 178.61 to 187.24, is composed of finer bed material and the geometric mean of samples 1, 2, 3, 7, 8, and 12 is used for the bed material size gradation in that reach of river as shown in Figure 34. The upper zone, from RS 190.05 to 199.07, is composed of coarser bed material and the geometric mean of samples 4, 5, 9, 10 and 11 is used for the bed material size gradation in that reach of river as shown in Figure 34. Within the middle zone, from RS 187.24 to 190.05, the HEC-6T program linearly interpolates the bed material size distribution between the upper and lower zones as a function of distance between those zones.

OTHER INPUT

Erosion and Deposition Limits

At each computational time step and at each cross section in the model, the HEC-6T program can represent either erosion (scour) or sedimentation (fill), but not both occurring concurrently at a section. However, in the river it is possible, and even likely, that during floods the channel of the river experiences scour while the vegetated overbank experiences fill. For the study area, this is a limitation that must be carefully considered in both model construction and the interpretation of model results. Although the model does not allow concurrent scour and fill at a cross section, the program does allow for definition of the zone of scour and a separate definition of the zone of fill. That is provided by the erosion limits and deposition limits which are specified as cross section stationing on the HE and HD records, respectively. During the execution of an HEC-6T model, if the program calculates a greater transport capacity than sediment

influx from the next upstream cross section, then that section is eroded. The amount of erosion is calculated as the equivalent uniform depth to satisfy the scour quantity and the bed elevation is lowered by a that uniform amount between the erosion limit stations of that section. Conversely, if the program calculates an excess of sediment influx over the transport capacity, the deposition is calculated as the equivalent uniform depth of sediment excess and bed elevation is raised that uniform amount between the deposition stations of that section. In both cases of erosion and deposition, the raising or lowering between the deposition or erosion limits is only for the portion of the section that is below the calculated water surface elevation.

In the model of the El Rio study area, the erosion limits are set at the bank stations of each cross section. The bank stations are set based on inspection of 1993 aerial photographs. Those photographs clearly indicate where vegetation clearing and channel bed erosion occurred. The width of the bank stations and erosion limits ranges from 766 feet to 4620 feet. The deposition limits are set at the end points of each cross section.

Reservoir Depth

The reservoir depth in HEC-6T is the depth of erodible bed material within the specified erosion limits. The reservoir depth sets a maximum scour depth at each cross section. The reservoir depth was set at 10 feet although the depth of erodible bed material is certainly much greater than 10 feet throughout the entire length of the Gila River study area. The output of HEC-6T was inspected and the erosion depth never exceeded the reservoir depth for any conditions that are modeled. If that model is used for any other analysis, the results must be checked to ascertain that the 10-foot reservoir depth is not erroneously constraining the erosion depth in the model.

Transport Function

HEC-6T has numerous transport functions coded into the program. The Yang Stream Power function was selected because it models the range of sand and gravel bed material of the Gila River. That transport function contains both the sand (Yang, 1973) and the gravel formula (Yang, 1984). The applicable size range is from 0.015 mm to 10 mm. Approximately 99 percent of the bed material is in that range.

Boundary Conditions

For the purpose of hydraulic calculations, a starting downstream water surface must be specified for each hydrologic time step. The boundary condition is specified as a water surface elevation rating curve for the first downstream cross section. That rating curve was established by using an HEC-RAS model of the river for a range of discharges. That rating curve is shown in Figure 35.

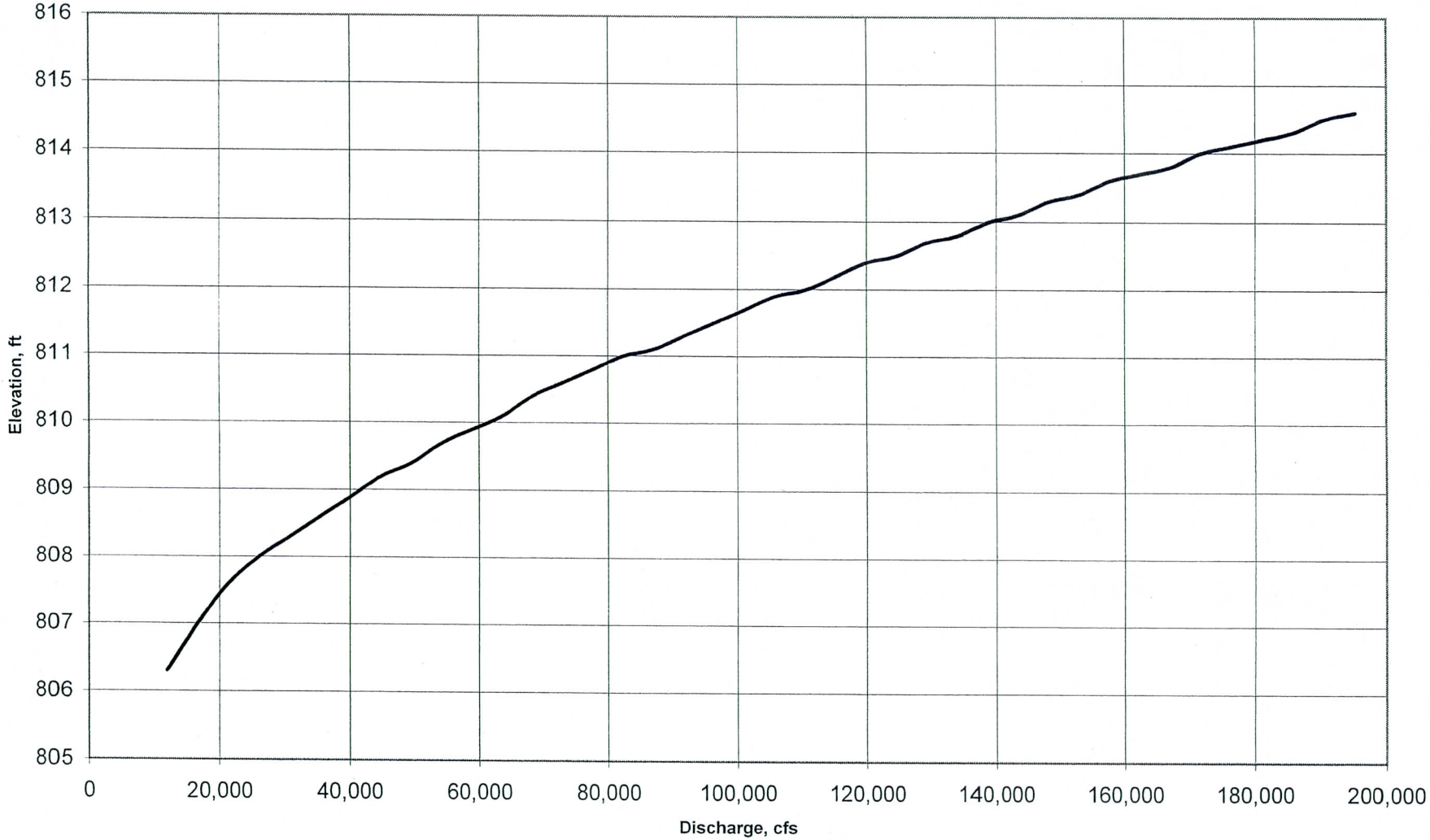
Other Input Data

The following is a list of other input data:

- The fraction of bed material that is exposed to erosion is set to 100 percent. This indicates that the entire bed is allowed to erode.

- The specific gravity of bed material is set to the HEC-6T default of 2.65.

Figure 35
Initial Water Surface Elevation Rating Curve



- The grain shape factor is set to the HEC-6T default of 0.667. A shape factor of a perfect sphere is 1.0 while a very irregular shape has a factor as low as 0.1.

- The coefficient in surface area exposed is set to the HEC-6T default of 0.5.

- The unit weight of deposited sediment is set to the HEC-6T default of 93 pounds per cubic feet.

- The water temperature is set to 68° Fahrenheit.

LIMITATIONS AND ASSUMPTIONS

The following are limitations and assumptions in HEC-6T modeling for this study:

- The Gila River is a highly complicated and variable system. Certain modeling assumptions (as detailed in the preceding sections) were applied to simplify the system for a one-dimensional sediment transport analysis.

- The HEC-6T program requires appropriate input data based on physical measurements and data analysis.

- Interpretation of HEC-6T results is contingent upon model input and the limitation of certain modeling options.

- Model results are based on hydraulic geometry data from a 1993 floodplain study. The model does not account for changes in the river since 1993 nor future changes in the watercourse.

- HEC-6T cannot model bridges or culverts. There are four bridges in the study area, SR 85, Tuthill Road, Estrella Parkway and Bullard Avenue. The geometry of the cross sections near the bridges was not modified.

- The modeling assumes the vegetation does not change during floods.

- Size gradation of the bed material is represented by a finite sampling of that material, and actual sampling represents a small area of the watercourse. Sensitivity analysis indicates that uncertainty in this parameter has minor effect on model results.

- HEC-6T can only model erosion or sedimentation during a time step. It is possible for the river to experience erosion and sedimentation at a cross section at the same time.

- HEC-6T cannot model the lateral movement of the main channel, or river banks.

- Inflowing sediment for tributaries of the Gila River, such as the Agua Fria River and Waterman Wash, are assumed to be negligible because the discharges from the tributaries are relatively small compared to the discharges of the Gila River

during floods. Inflowing sediment is defined for the upper boundary of the study.

- Inflowing bed material sediment load is transport capacity controlled and is estimated using data for the Gila River near Gillespie Dam. The inflowing sediment relation does not vary for each event or temporally during the event.

- The period of record used for the hydrologic data is representative of what the watercourse may see in the future. Flow rates less than the channel forming discharges are not modeled. Sediment transport rates for low discharge events are relatively low and the hydraulics of those flows are inconsequential in regard to the channel forming capacity of larger floods.

- Starting water surface elevations that are based on normal depth hydraulics assume a stable reach with neither scour nor fill.

- Sediment transport in the watercourse can by modeled by the Yang Stream Power Function.

HEC-6T MODEL DEVELOPMENT

INTRODUCTION

The modern (post 1900) Gila River is a highly complicated fluvial system of open channel hydraulics, sediment transport and riparian environment. Factors compounding this are highly variable flow rates, braided streamform with shifting geometry, changing vegetation conditions in time and space, and man-induced impacts due to upstream water resources development. Flow rates vary from near zero streamflow for extended periods to flood discharges in excess of 100,000 cfs and a 100-year instantaneous flood peak discharge of 227,000 cfs. Vegetation varies from native species, such as willow, to non-native species, such as tamarisk. Vegetation has also varied in time, particularly since the influx of tamarisk (probably prior to 1930). Vegetation is affected by natural events such as floods that clear corridors for water conveyance, and by man-induced impacts such as vegetation clearing and nutrient rich return flows to the river that nourish plant growth. Dense tamarisk stands have encroached on the river contributing to zones of sediment deposition. The geometry of the river can change dramatically from one event to another; braids shift and disappear and then reappear. It is highly influenced by man due to upstream depletions and flood regulations, sand and gravel mining, agricultural and wastewater return flows, land development and introduction of non-native plant species.

This section presents the development of the HEC-6T model of the El Rio study area of the Gila River. Input to the model is described along with complicating issues and how those issues were resolved. The limitations of the HEC-6T program (MBH Software, Inc., 2002) are presented along with descriptions of how the model input was configured within the confines of those limitations.

HYDROLOGIC DATA

Hydrologic input is provided as discretized, 24-hour duration mean daily discharges for the Gila River and Salt River above the confluence of those rivers. The input is a sequence of 63 days of historically based flood discharges plus a 12-day duration 100-year flood. The development of the hydrologic input to the model is described in the Hydrologic Input for HEC-6T Model section of this report. The following are issues concerning the hydrologic input:

- The flow is unsteady with rapidly rising and falling discharge rates.
- Flow is non-uniform and may be critical or supercritical under certain flow conditions in various reaches of the watercourse. If the flow is supercritical, HEC-6T determines the water surface elevation based on the supercritical normal depth. The sediment transport calculations in supercritical reaches are simplified.
- HEC-6T is a one-dimensional sediment transport model. It cannot model lateral flow, flow around bends, or other flow irregularities.

- Flow rates less than the channel forming discharge are not modeled. Sediment transport rates for floods smaller than the channel forming discharge are relatively low and the hydraulics of those low flows are inconsequential when compared to the channel forming capacity of larger floods.

- The hydrologic record is an estimate of what the river may experience in the future. The actual flows may increase or decrease depending on a variety of factors, including man-made influences in the watershed and upstream watercourses.

- The flow rate for a time step in the study area is assumed to be constant.

- The water discharge from tributaries is assumed to be negligible compared to the flow rates in the Gila River.

GEOMETRY AND HYDRAULIC DATA

Geometry Data

Major issues concerning the geometry input of the Gila River are:

- HEC-6T uses the hydraulics calculated between the designated bank stations to calculate the sediment transport capacity and thereby the equivalent uniform depth of erosion (scour) or sedimentation (fill). If the bank stations are left the same as in the Baker model then the calculated hydraulics and resultant sediment transport capacity could produce an underestimate in the amount of scour and an overestimate in the amount of fill.

- If the bank stations are moved too close together, the model could produce an overestimate in the amount of scour and an underestimate in the amount of fill.

- In areas of the Gila River there are multiple braids. The main channel can consist of one or several braids. Also, the main channel can change from one event to another. HEC-6T is a one-dimensional sediment transport model that cannot model the lateral movement of braids.

- The corridor cleared by the FCDMC is approximately 1,000 feet wide. Portions of the main channel match this width, other portions exceed this width.

- A limitation of HEC-6T is the manner in which the river geometry is adjusted in response to either erosion (scour) or deposition (fill). In either case, the appropriate channel bed elevation between the erosion limit or the deposition limit is moved up or down a uniform amount regardless of hydraulic conditions at various locations in the cross section.

In the sediment model, the bank stations are set at the erosion limits. The average bank station width is approximately 1,970 feet. The bank stationing does not change during the duration of the hydrologic event that is modeled with HEC-6T.

Hydraulic Data

Hydraulic data describes the physical geometry of the watercourse and flow resistance factors. The data is essentially the same information that is required for a water surface profile analysis, such as performed using HEC-2 or HEC-RAS. The existing HEC-RAS model of the Gila River that previously was developed by Baker (1999) for the purpose of a floodplain delineation study is used as the source of the hydraulic and geometric data. Certain modifications were made to the model to achieve the purpose of the sediment studies.

The Baker hydraulics model contains the following features:

- 233 cross sections for approximately 20.5 miles of the Gila River with a spacing of approximately 500 feet. The geometry for the cross sections was generated using mapping that was obtained in 1992 and in 1993 after the flood.

- Four bridges located at SR 85, Tuthill Road, Estrella Parkway, and Bullard Avenue.

- Multiple Manning's roughness coefficients for the channel and overbanks. The n-value for areas in the main channel ranged from 0.026 to 0.032. The n-value in the densely vegetative zones were as high as 0.15.

- Bank stations were, in general, located near the floodway boundary with an average channel width of 3,500 feet.

Modifications were made to the model for erosion and sedimentation modeling purposes. These include removing the bridges, relocating the bank stations, and changing the n-values.

The bridges were removed because HEC-6T does not have the capability to model bridge hydraulics. The section immediately downstream of the bridge was also removed.

Because HEC-6T uses the area between the bank stations to calculate the hydraulics for the sediment transport analysis, the bank stations were moved to include only the main channel where the majority of the sediment transport is taking place. The bank stations in the HEC-6T model are approximately 1,970 feet apart. The locations were further refined by adjusting for dense vegetation zones.

Vegetation

Issues concerning vegetation when developing model input are:

- Downstream of 211th Avenue there is extensive encroachment on the river by tamarisk.

- The tamarisk stands decrease the flow velocity, which results in sediment deposition.

- Aerial photographs of pre- and post-1993 flood (peak discharge of 130,000 cfs) show dense tamarisk stands remaining in place. The 1993 flood was estimated to be a 30-year event. It is unknown what portion of the tamarisk will be removed or laid down during flow rates greater than the 30-year event.

The model cannot adjust the roughness coefficient for changes to vegetation during flows. The high flow resistance of the dense vegetation areas is included in the conveyance weighted Manning's roughness values for the overbank areas. Bank station locations were selected so intervening areas do not contain dense vegetation. This modeling approach is intended to reproduce high sediment transport rates in the main channel. The model cannot account for simultaneous deposition in heavily vegetated overbank areas.

Manning's Roughness

The following are issues associated with modeling the hydraulic roughness for the model:

- Hydraulic roughness varies with depth. At low depths, the river bed and banks influence the roughness more than at greater depths.

- The roughness varies across the cross section. Cross sections may include backwater areas, thick vegetation zones, sand bars, multiple braids and a main channel.

- As discharges pass through the watercourse, the bed material can become coarser or finer due to hydraulic sorting or deposition.

- As the flow rate changes during an event, the bedform can cause reflecting changes between lower regime and upper regime flows. Standing waves, associated with upper regime flow, are observed in aerial photographs of the 1993 event. Change in bedform of an alluvial river can significantly alter the flow resistance and the sediment transport rate.

- During a flood the vegetation can be ripped out or bent over, decreasing the hydraulic roughness and increasing the conveyance capacity. This depends on the type of vegetation, density, maturity (height) and flow depth (U.S. Geological Survey, 1998).

HEC-6T has the capability to model the following:

- Three n-values for each cross section: one n-value for each overbank area and one n-value for the channel.

- Vary n-value by depth, elevation or discharge for the left and right overbanks and channel.

A Manning's roughness value of 0.03 was selected for the channel. A sensitivity analysis on the selection of the channel roughness is included in the Model Input Sensitivity

Analysis section. The n-value for the left and right overbanks were calculated from the Baker HEC-RAS model using a conveyance-weighted n-value. The HEC-6T model was simplified by assuming that the n-value does not change with depth, elevation and discharge for the left and right overbanks. The HEC-6T model was further simplified by assuming the vegetation does not change.

MODEL VERIFICATION

PURPOSE

The purpose of model verification is to evaluate (test) whether or not the sediment transport model of the El Rio study area reach of the Gila River is reproducing the physical behavior of the river during floods. Ideally for model verification, the modeler would have pre- and post-flood geometry data, measurements of sediment load by size gradation both temporally and spatially during the flood, and accurate measurements of streamflow and water surface elevation and/or flood inundation limits. Regrettably, such data are not available in its entirety for the study area. However, regional data by the U.S. Geological Survey (USGS) are available to assess the reasonableness of the El Rio HEC-6T model. That data is used, to the extent practical, to verify the HEC-6T model.

VERIFICATION DATA

The best available data for model verification is that of the USGS measured at its sediment sampling gage for the Gila River at Gillespie Dam. That dam is located about 11 miles downstream of the study area. The dam was completed in 1921. That low, 20-foot high, diversion dam on the Gila River was completely filled to its top with sediment within a few years after its completion. Sedimentation of the delta continued over the life of the dam at a decreasing rate and by 1993 the sedimentation extended 4 miles or so upstream of the dam. The sediment delta had probably achieved near equilibrium by the end of 1980. By equilibrium it is meant that sediment load entering the delta upstream of the dam was conveyed through the delta and over Gillespie Dam; in other words, sediment inflow equaled sediment outflow.

Starting in 1975, the USGS collected intermittent suspended sediment samples of the streamflow of the Gila River from the Old U.S. Hwy. 80 bridge about ¼ mile downstream from the dam. Suspended sediment samples were sent to the USGS laboratory where sediment concentration was determined. For some of those sediment samples the percent of sand particles (larger than 0.062 mm) in the suspended sediment sample was measured by sieve analysis.

The USGS does not collect daily or even regularly scheduled periodic sediment samples. Rather, the USGS generally collects sediment samples either during floods or when there is appreciably high sediment load in the river. For the period from 1975 through 1995 the USGS reports 37 suspended sediment concentrations. Of those, 30 samples have percent sand load. Of those 37 sediment samples, eight are obtained after the breach of the dam in 1993 and three of those have percent sand data. The sediment concentration data of the USGS is presented in model verification graphs (Figures 36 through 45). In those graphs the sediment concentration data are presented graphically as pre-1993, which is the data prior to the breach of Gillespie Dam, and post-1993, which is the data after the breach of the dam. It is noted that the total sediment load data cannot be differentiated as to pre-breach or post-breach. That is, the breach of the dam did not appreciably increase the sediment concentration of the river over the naturally occurring high sediment load. The three sand concentration data points after the breach of the dam

are somewhat higher than the pre-breach sand concentrations. That, of course, can be expected during the period when sediment from the delta upstream of the dam was eroded and suspended in the flood flows of the Gila River.

In Figures 36 through 45, sediment concentrations from the HEC-6T model results are plotted on graphs that also show the recorded sediment concentrations by the USGS. Verification is by inspection of those graphs as to whether or not the total sediment concentrations and concentrations of sand load agree with measured data. The HEC-6T model does not report sediment concentration. Therefore, sediment concentrations are calculated by

$$C = \frac{Q_s}{0.0027 Q_w}$$

where C is concentration, in parts per million (ppm) or milligrams per liter (mg/*l*),

Q_s is sediment load, in tons per day,

Q_w is water discharge, in cfs, and

0.0027 is a unit conversion factor.

VERIFICATION RESULTS

For verification purposes, the 1993 flood (discharges larger than 35,000 cfs) was modeled and the results compared to USGS data. The 1993 flood started early in January 1993, peaking on 10 January 1993, and continued for about 6 months. Only days when the mean daily discharge equaled or exceeded 35,000 cfs are used in the HEC-6T model; that is 24 days. Therefore, it is only possible to compare model results for discharges greater than 35,000 cfs to measured concentrations that are less than 35,000 cfs except for one data point at 65,000 cfs. However, the trend of the cluster of data can be projected for greater discharges by inspection of the data.

Figure 36 shows the concentration of total sediment load entering the model at the upstream boundary (inflow) and the concentration exiting the model at the last downstream section (outflow). The inflow is the sum of sediment entering the model from both the Gila River and the Salt River. The model results show that the concentrations of both the sediment inflow and outflow are in agreement with the recorded USGS data. The HEC-6T model is executed with discharges through the study reach that equal or exceed 35,000 cfs. There is only one USGS data point for a discharge larger than 35,000 cfs, and the HEC-6T results closely agree with that data point. Figure 37 is similar to Figure 36 except that it is for the sand portion (bed material load). The model results agree with the recorded data trend.

Figures 38 and 39 are for total sediment load and sand load, respectively. In those figures, the concentrations are shown at each of the 229 modeling sections for six discharges from 35,000 cfs to 132,100 cfs. Those model concentration points can be envisioned as "simulated sediment samples" that are instantaneously taken, one at each modeling section, at a point in time corresponding to a given discharge. The plotted

results are a vertical cluster of 229 data points for each discharge. The "scatter" of total sediment concentration throughout the modeled reach of river is as much as 50 percent (more than 11,000 ppm to less than 6,000 ppm at 62,000 cfs) to about 10 percent at 132,000 cfs (about 31,000 ppm to about 35,000 ppm). The scatter of model results is much greater when only the sand load is considered (see Figure 39). At 132,000 cfs, the sand concentration varies from about 850 ppm to about 4,000 ppm, a nearly 500 percent range.

In interpreting the total sediment load and sand load concentration graphs, two factors must be kept in mind: First, the sand (bed material) is between 10 to 20 percent of the total sediment load, and the concentration scales of the respective graphs are different; the total sediment load graphs extend to 100,000 ppm. Second, the wash load is transported through the model without gain or loss from one section to the next. Therefore, the concentration of wash load, which is about 80 to 90 percent of the total load, is constant at each discharge throughout the river length.

The model results presented in Figures 40 through 45 are similar in that each shows sediment concentrations from a section of the river for each of the 24 flood discharges. Those model concentration points can be envisioned as daily "simulated sediment samples" that are taken from a imaginary bridge at a given station on the river as the 24 days of flood passes the bridge. Figures 40 and 41 are for total sediment load and sand load, respectively, at station 195.00, which is just downstream of the Agua Fria River confluence near the Bullard Bridge. Figures 42 and 43 are for total sediment load and sand load respectively, at station 192.33, which is in the King Ranch region near the proposed Cotton Lane Bridge. Figures 44 and 45 are for total sediment load and sand load, respectively, at station 184.71, which is about 1.6 miles downstream of Waterman Wash and about 4.7 miles upstream of the SR 85 Bridge. Those figures all demonstrate concentrations of total sediment load and sand load that are in good agreement with available sediment concentration data.

As a final verification, the total load (tons) of sediment was calculated for the 24 days of the 1993 flood that are modeled by HEC-6T. The HEC-6T model reports a total sediment load of about 95 million tons. By comparison, the corresponding sediment load estimated by Sabol (1997) for the 1993 flood at Gillespie Dam for the period from 1 January through 28 April 1993 is about 112 million tons of total sediment. For the concurrent days that are used in the HEC-6T model, the estimated sediment loads are 94 million tons of total sediment load.

SUMMARY OF VERIFICATIONS

1. The concentration of total sediment load and sand load that are calculated from the HEC-6T model closely agree with measured sediment concentrations as reported by the USGS for the Gila River at Gillespie Dam.

2. The sediment load from the HEC-6T model for the 24 modeled days of the 1993 flood closely agree with independent estimates of the sediment load for the Gila River at Gillespie Dam.

Figure 36
Comparison of total sediment load concentration for inflowing and outflowing sediment from the model to USGS data

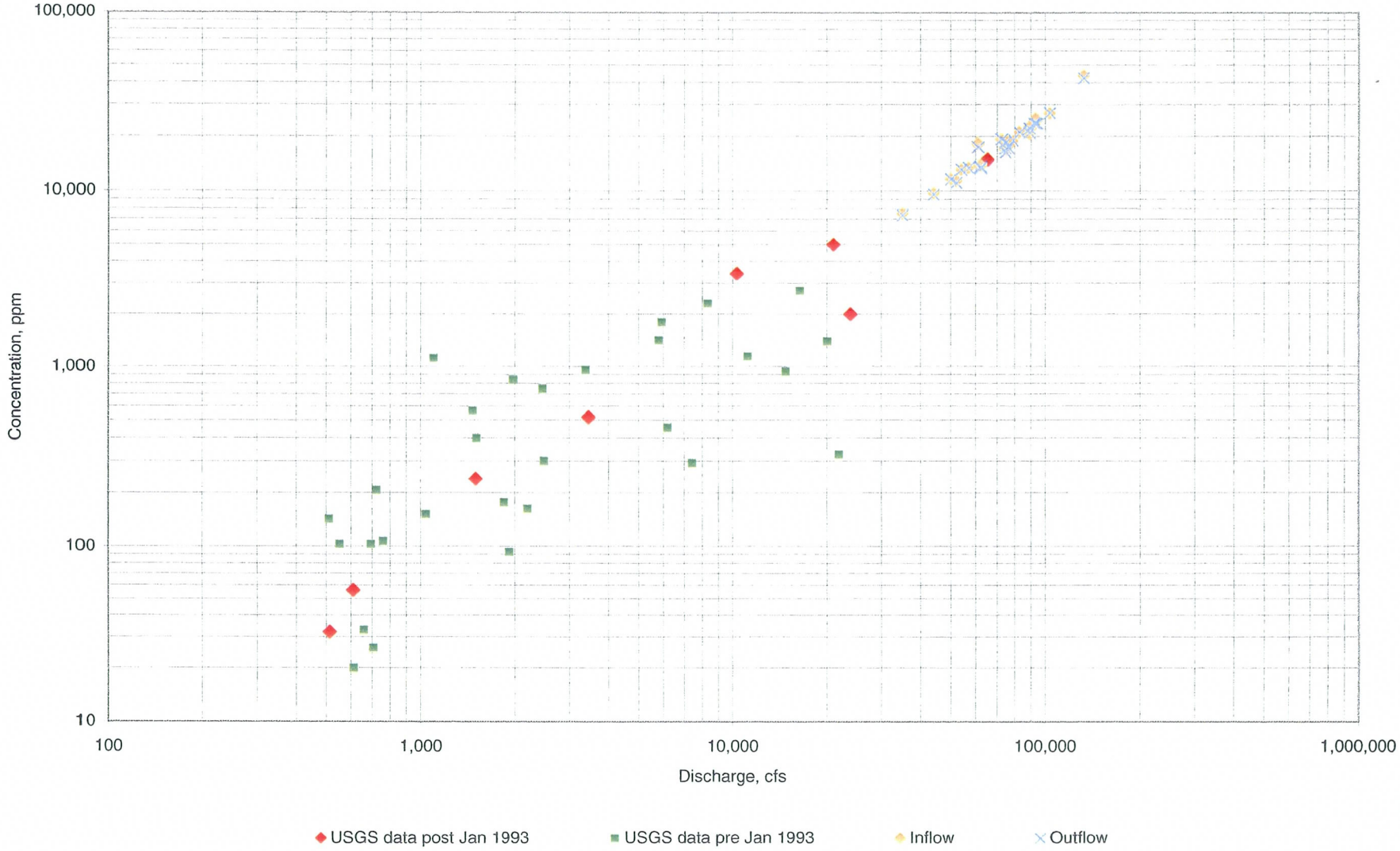


Figure 37

Comparison of sand concentration for inflowing and outflowing sediment from the model to USGS data

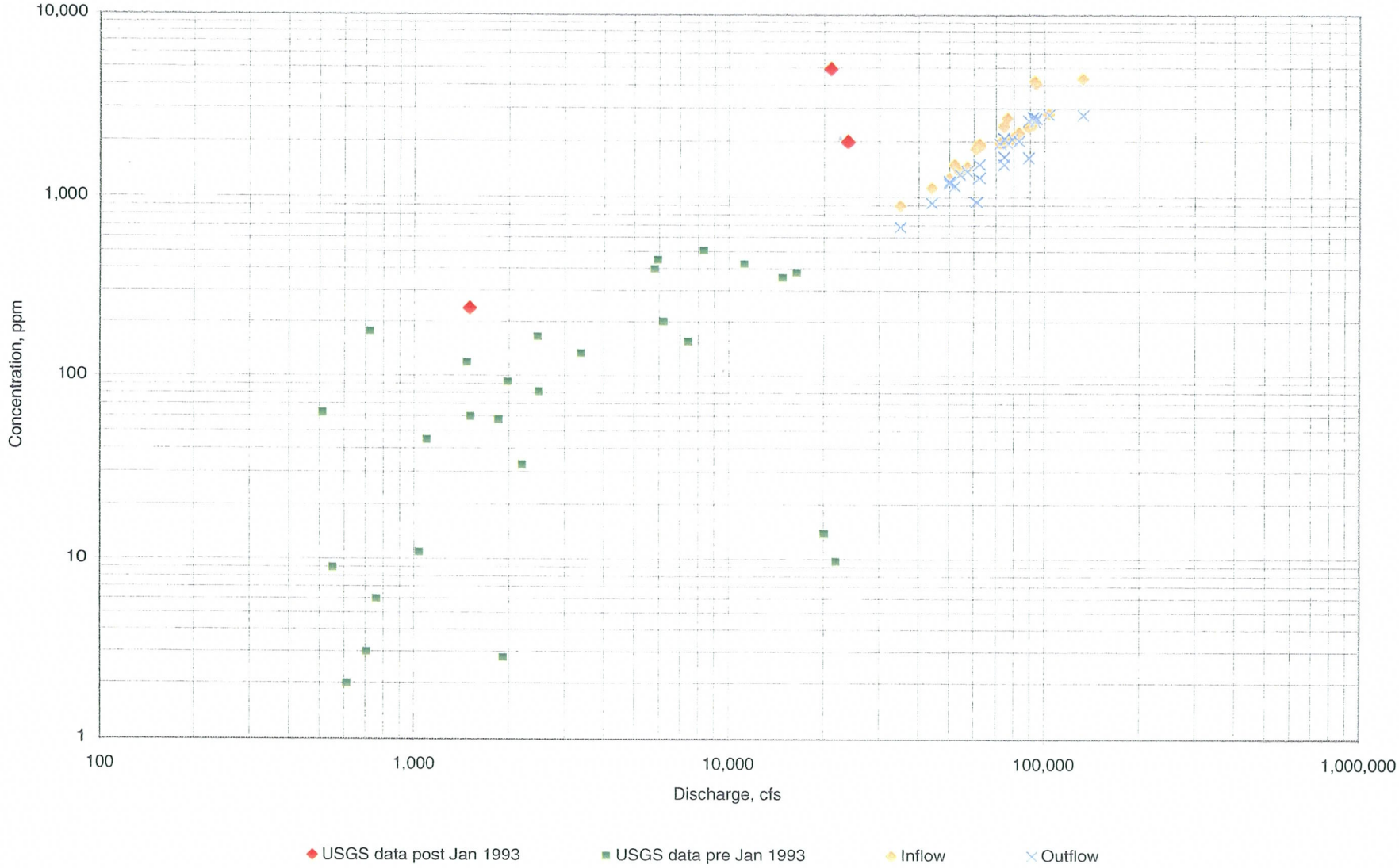


Figure 38
Comparison of total sediment load concentration from the model to USGS data at various discharges

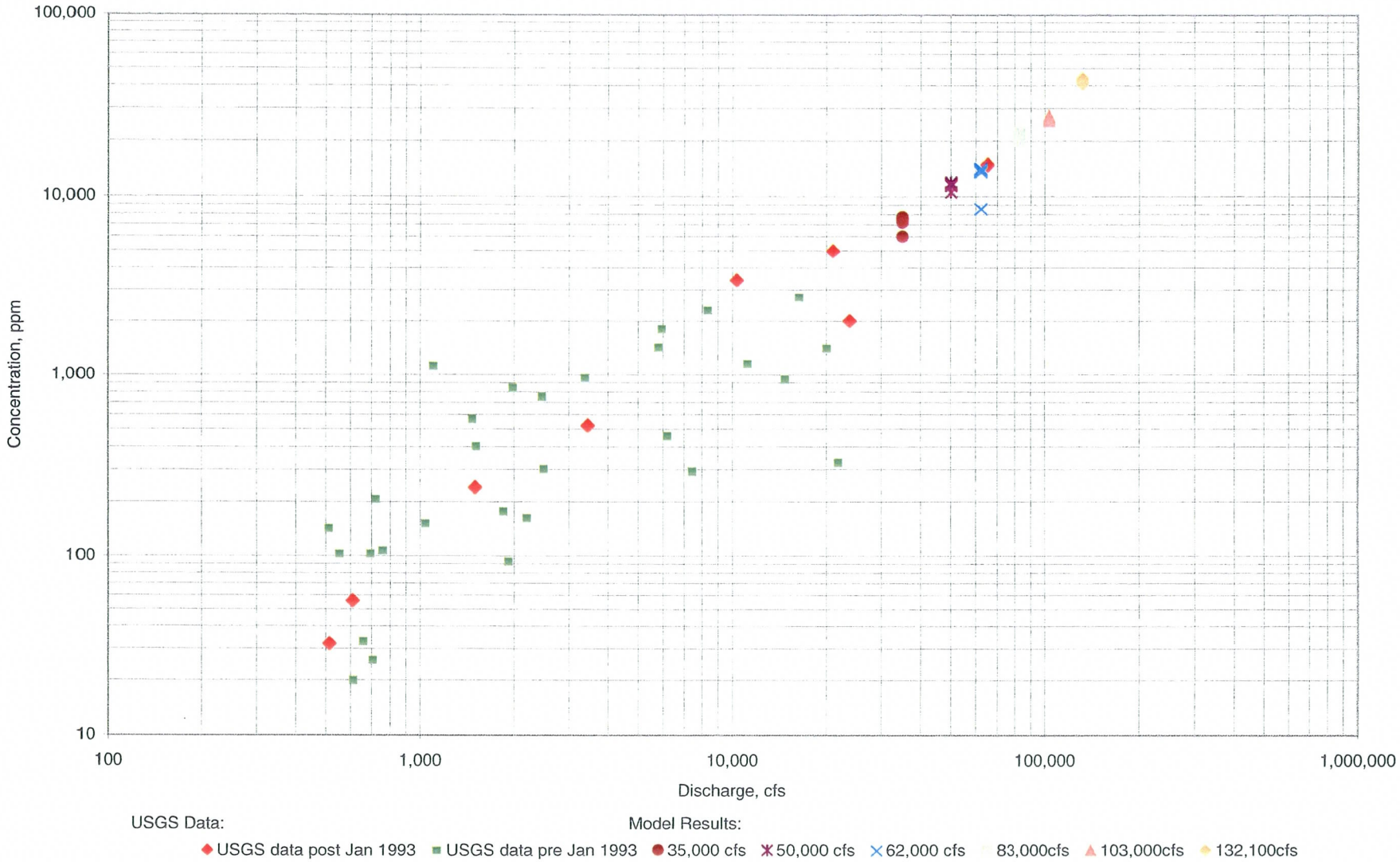


Figure 39
Comparison of sand concentration from the model to USGS data at various discharges

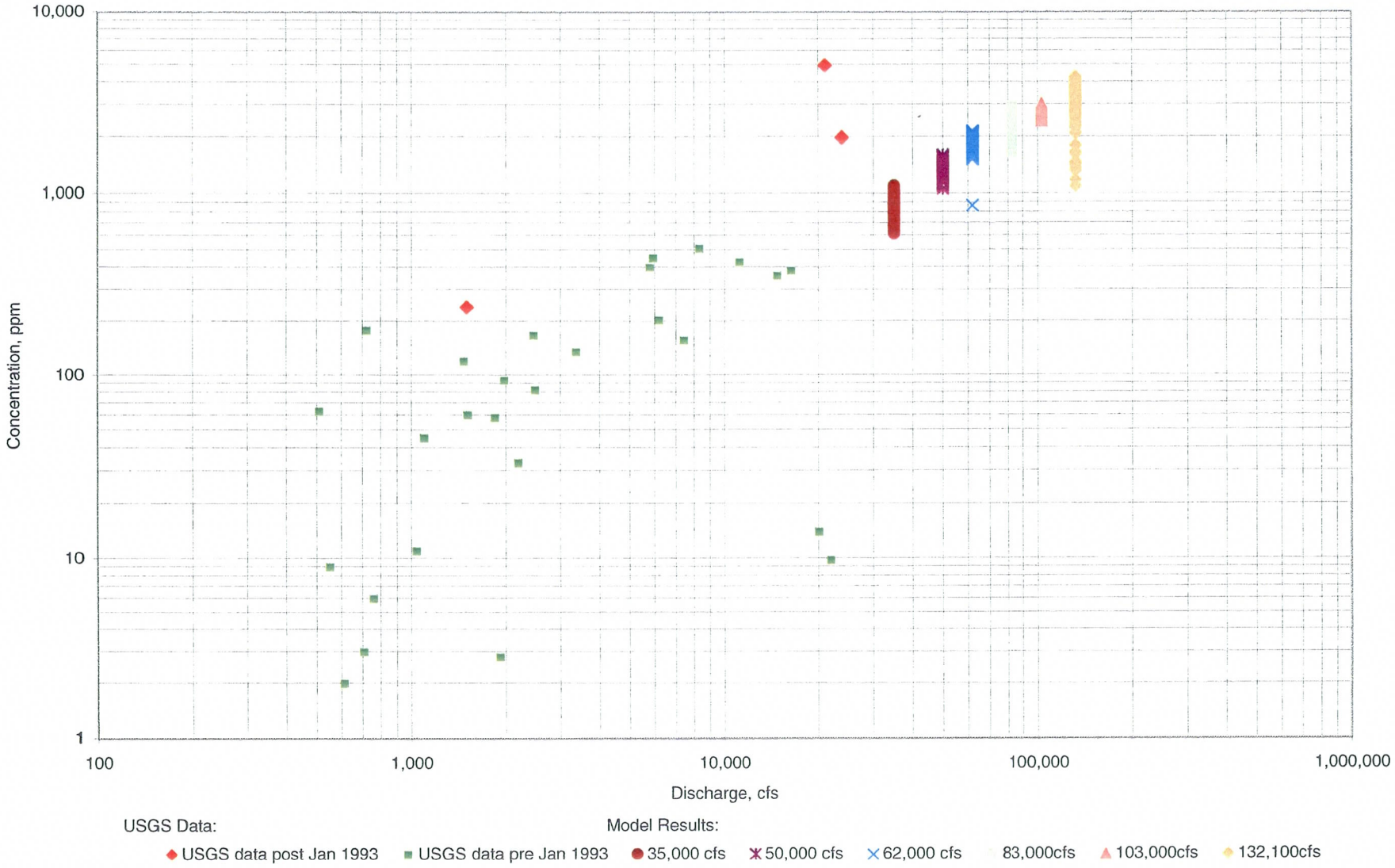


Figure 40
Comparison of model results for total sediment load concentration to USGS data at a cross section in the upper portion of the study area

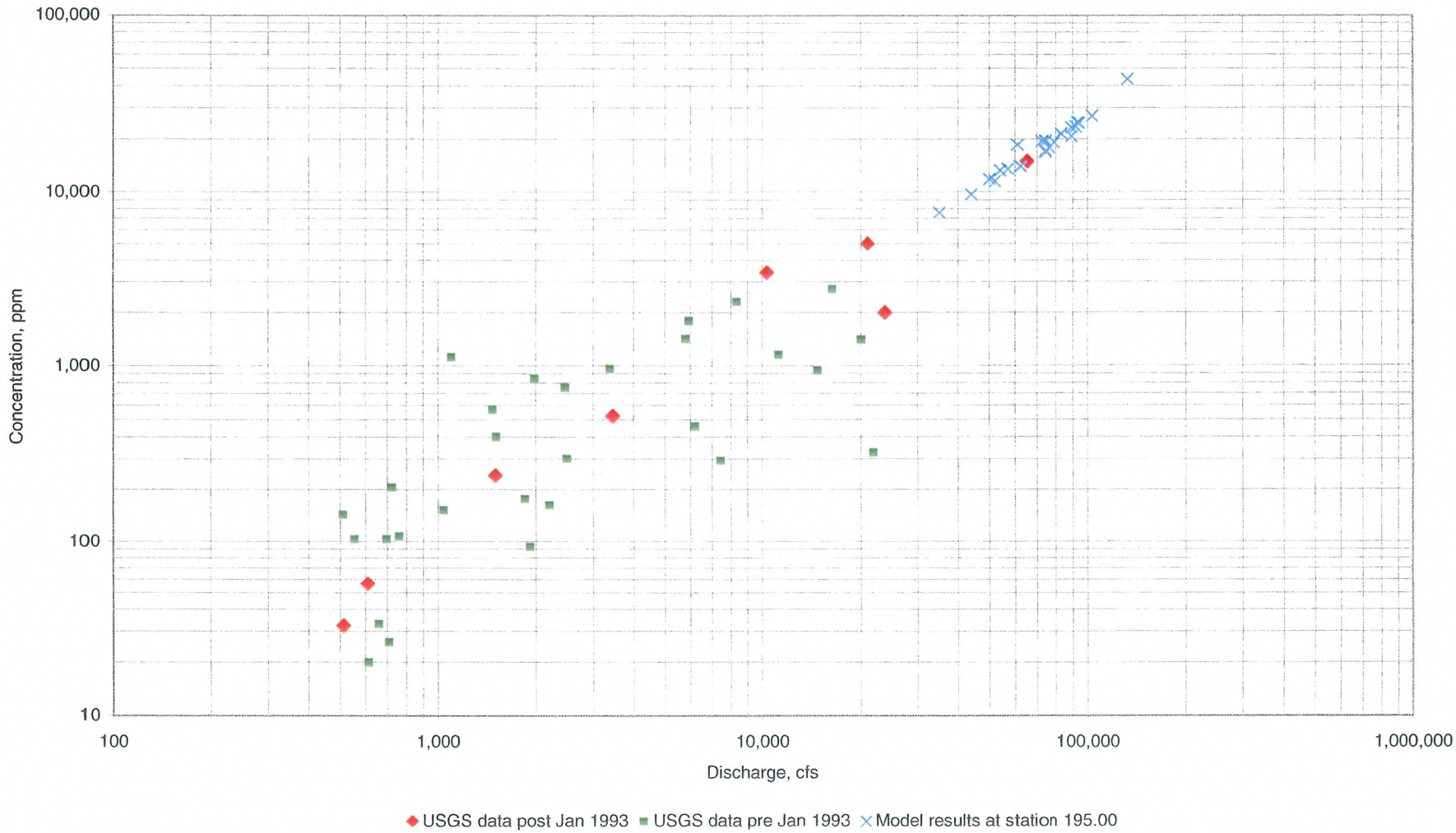


Figure 41
Comparison of model results for sand concentration to USGS data at a cross section in the upper portion of the study area

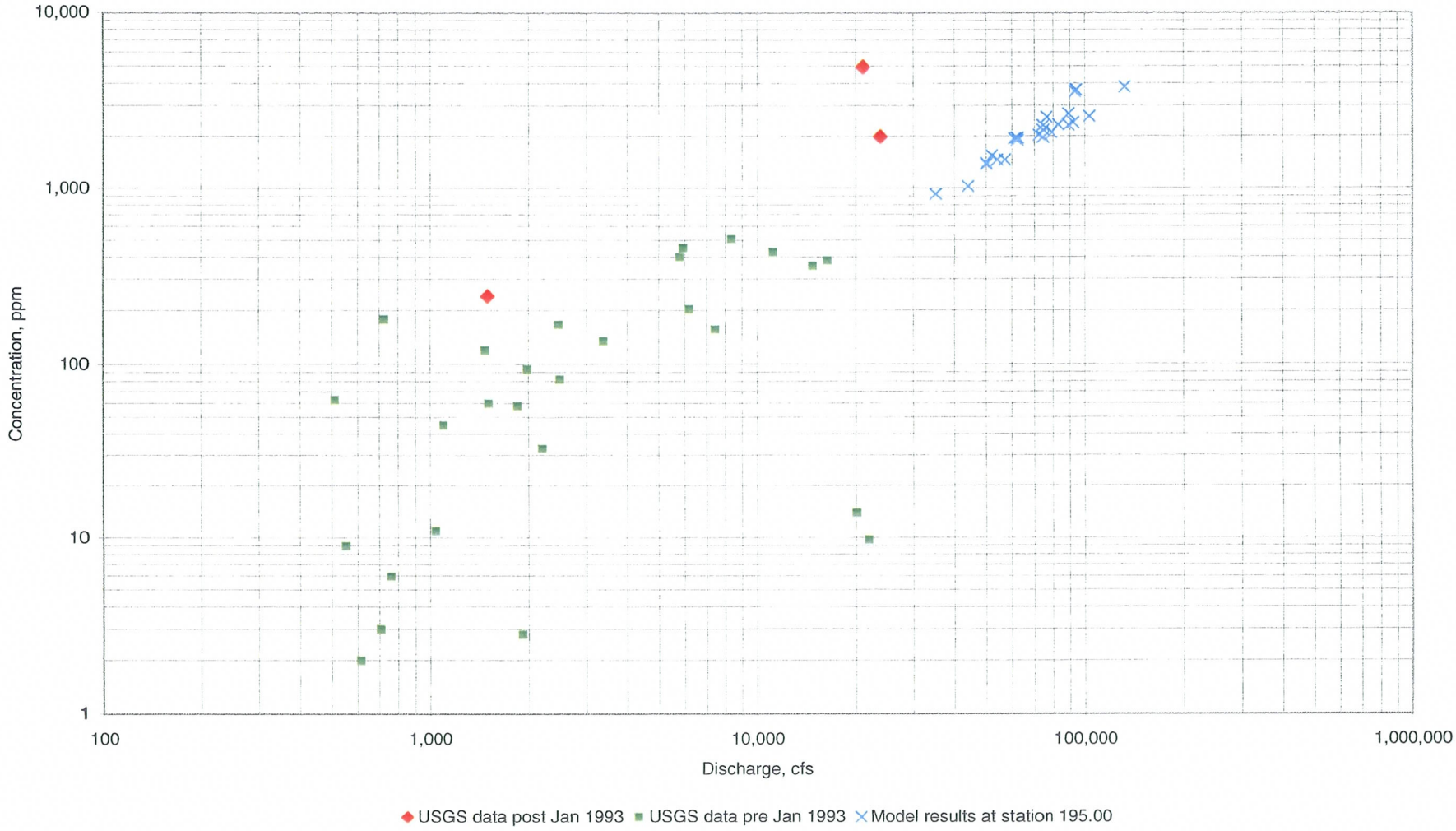


Figure 42
Comparison of model results for total sediment load concentration to USGS data at a cross section in the area of new topography within the study area

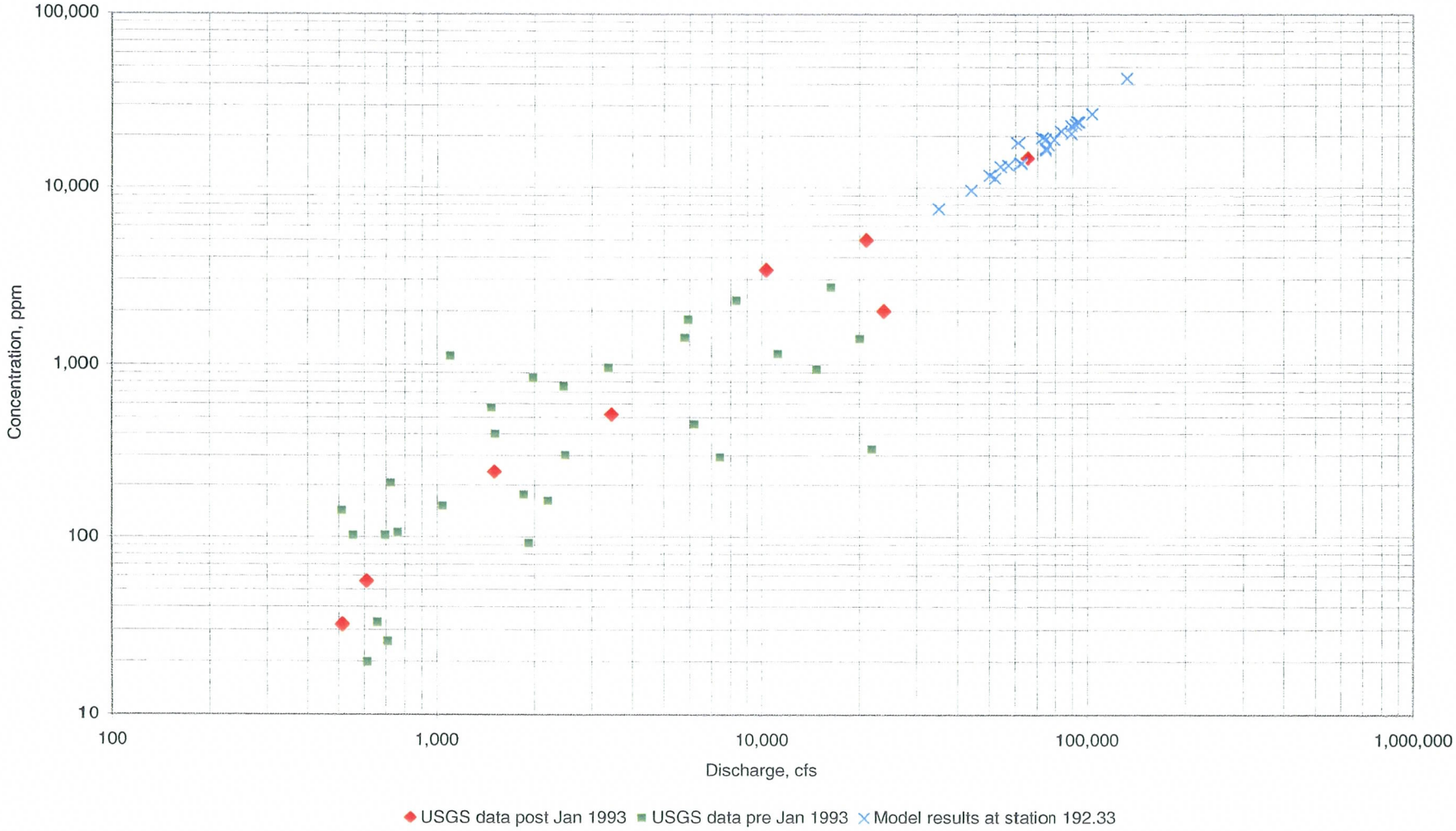


Figure 43
Comparison of model results for sand concentration to USGS data at a cross section in the area of new topography within the study area

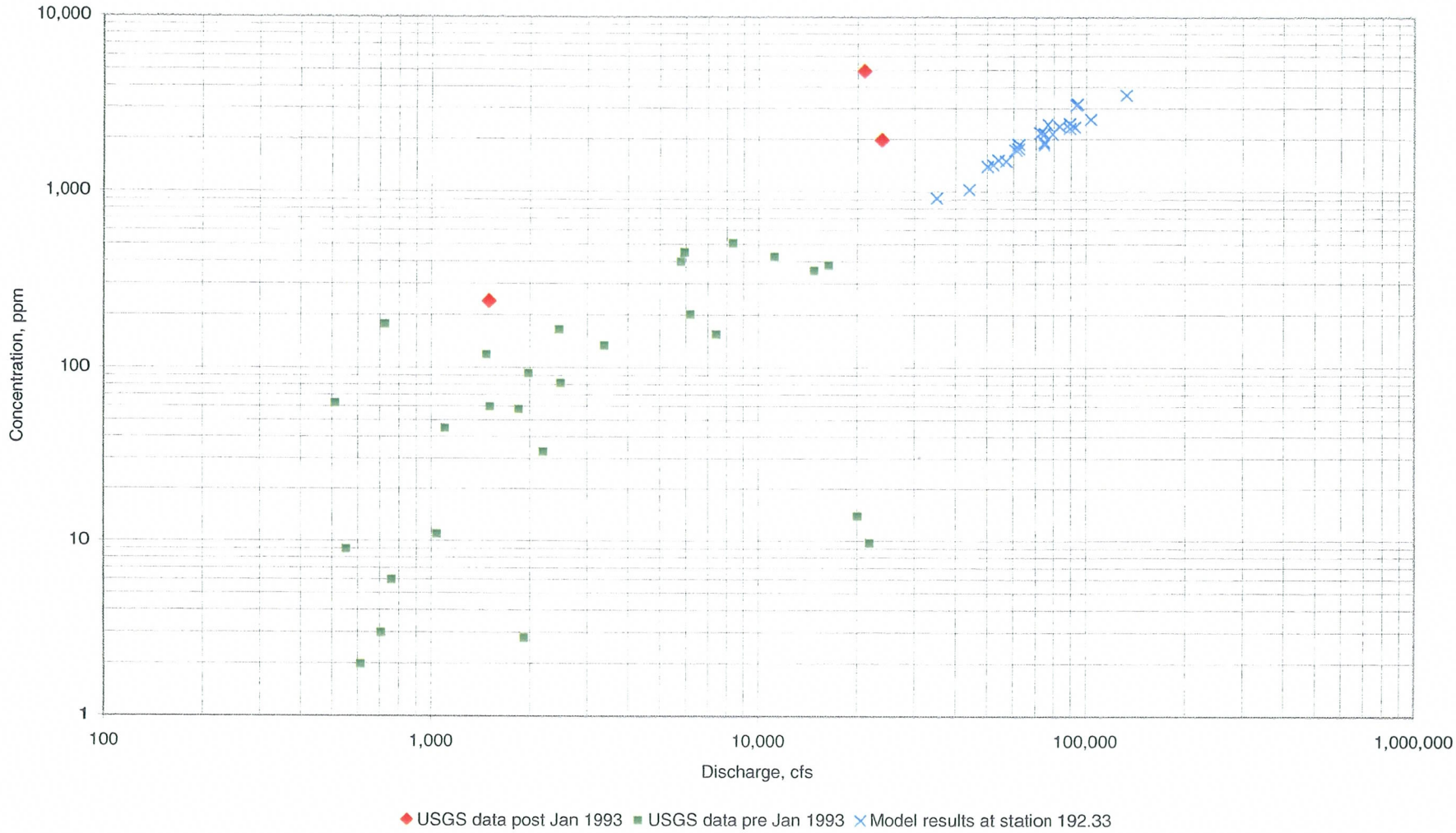


Figure 44
Comparison of model results for total sediment load concentration to USGS data at a cross section in the lower portion of the study area

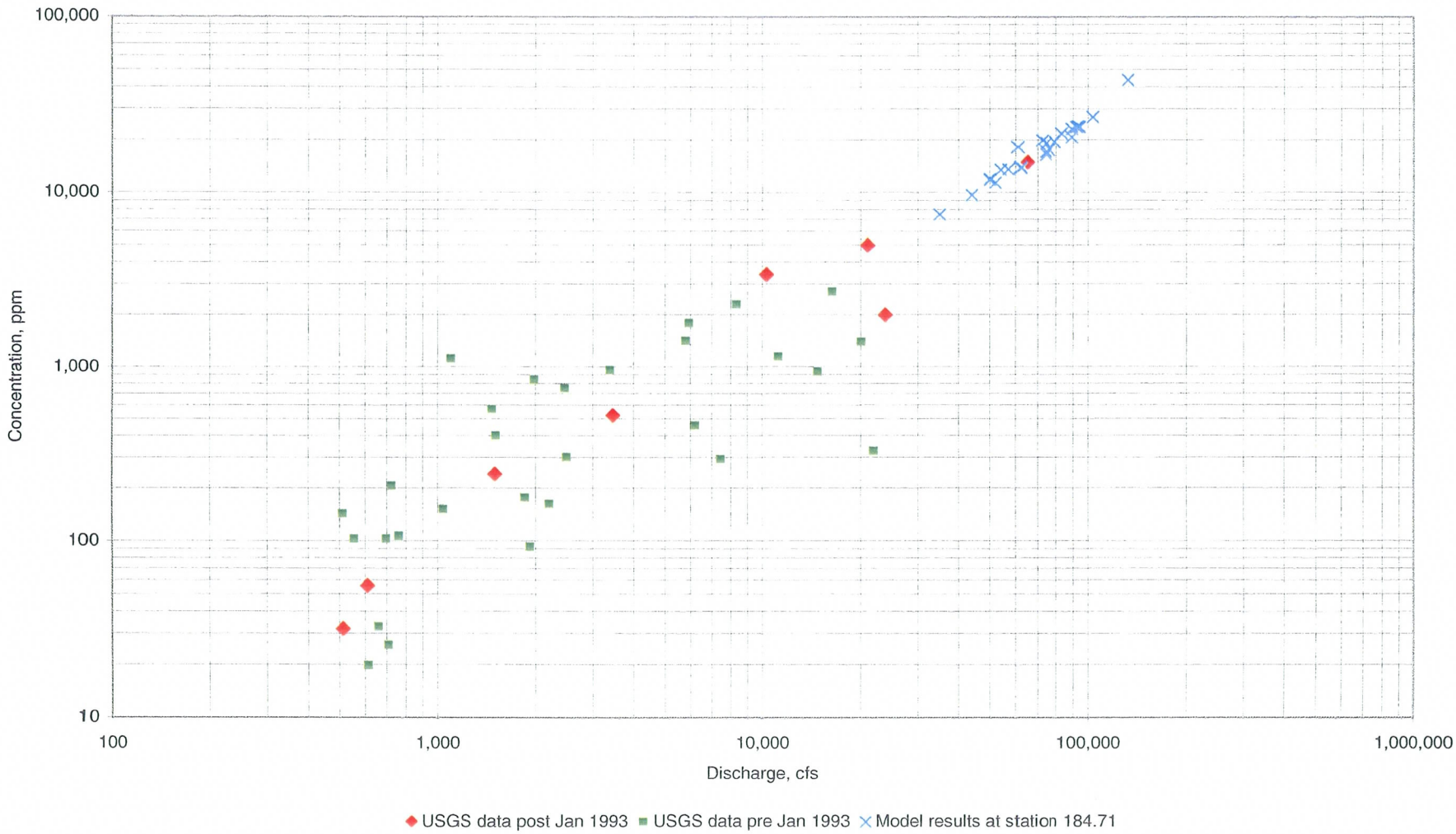
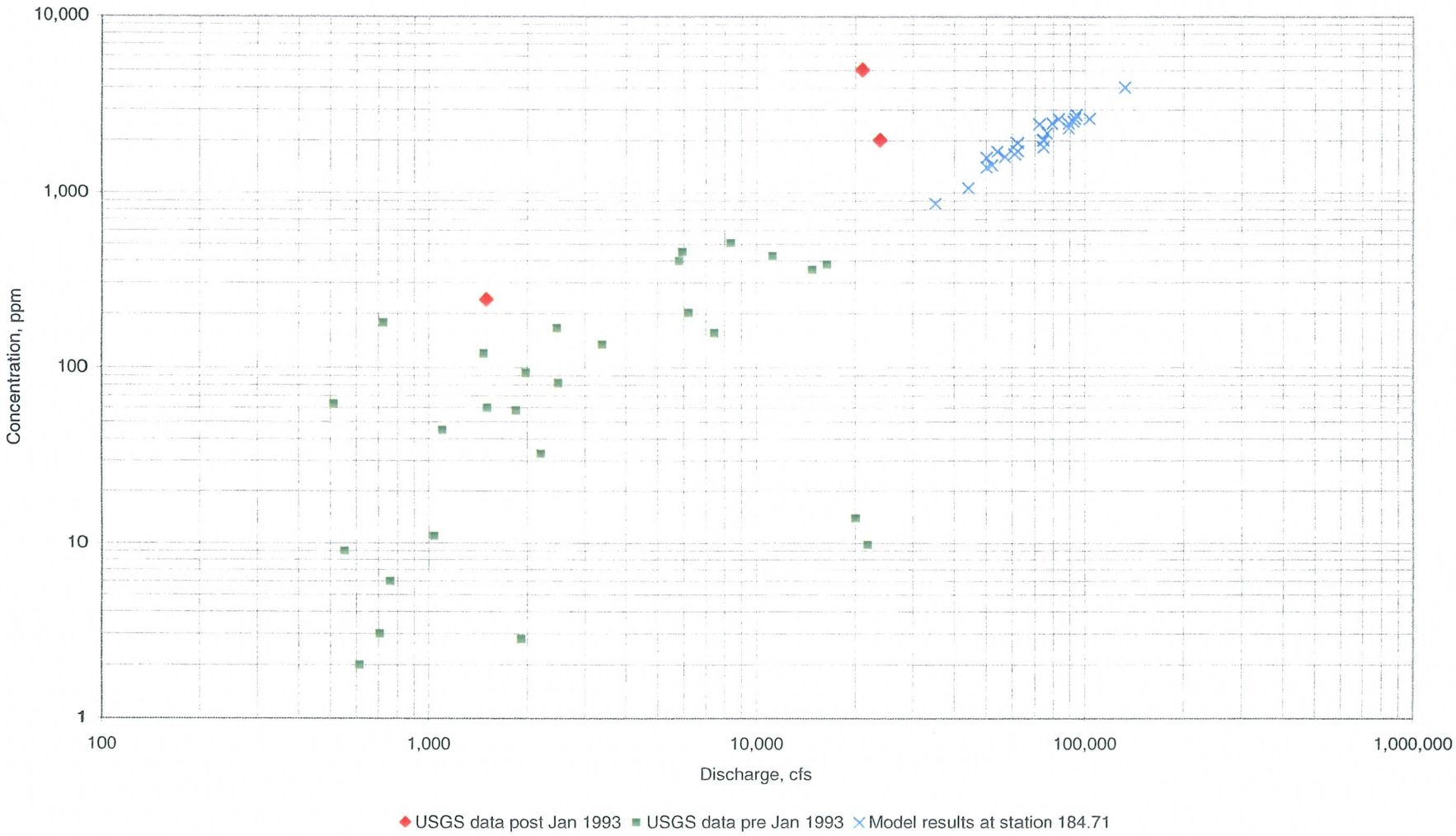


Figure 45
Comparison of model results for sand concentration to USGS data at a cross section in the lower portion of the study area



RESULTS OF THE EXISTING CONDITION HEC-6T MODEL

DESCRIPTION OF THE MODEL

The HEC-6T model is configured to represent the river in its existing (2004) condition. The input to the model is described in previous sections of this report. The El Rio reach of the Gila River is shown in Figure 46. That figure is a 2004 aerial photograph of the river with the following shown:

- cross-section stations and river mile numbering
- location of bank stations and erodible limits
- 100-year floodplain limits
- floodway limits

The model configuration is summarized as follows:

Hydrology

- Quasi-synthetic sequence of floods based on recorded USGS data extending from 1921 through 2004.
- Contains a synthetic 100-year flood.
- Represents channel forming discharges of 35,000 cfs and larger.
- Streamflow is at the confluence of the Gila and Salt Rivers with separate inflow from each river.

Geometry

- Cross-section geometry for the El Rio study area is obtained from the Baker flood delineation study.
- Cross-section geometry for the Cotton Lane Bridge/King Ranch reach of the river was obtained from the WEST Consultants, Inc. 2005 HEC-6T model.
- Cross-section locations are shown in Figure 46.

Bed Material Size Distribution

- Bed material size distribution is based on bed material sample data.
- The upper reach of the river is a coarser grain size representing a transition zone of inflow of gravel and cobble from the Salt River.
- The lower reach of the river is represented by a finer grain size.

- The HEC-6T model interpolates grain size for the intermediate area based on the input grain size of the upper and lower reaches.

Inflowing Sediment

- Inflowing sediment rating curves are provided for the Gila and Salt Rivers above their confluence.
- The sediment rating curves are based on available USGS data.
- The rating curves are for total sediment load; that is, bed material load plus the finer wash load.

Bank Stations

- Bank stations define the "channel" of the river. Areas outside the channel are the overbanks. Hydraulics for sediment transport are calculated for the channel.
- Bank stations are assigned based on inspection of aerial photography, cross-section geometry, vegetation and hydraulic analyses (HEC-RAS results).
- Channel width is defined as the width of river between the two bank stations. The channel width is illustrated in Figure 47.
- The channel width ranges from a minimum of about 750 feet to a maximum of more than 4,500 feet.
- Typical channel width is 1,500 to 2,000 feet.

HYDRAULICS OF THE MODEL

Figure 48 shows the percent of flow that is conveyed in the model channel for the model low flow of 35,000 cfs and the model high flow of 200,000 cfs. The majority of the flow of the river is conveyed within the defined channel. The model is configured such that the channel also defines the erodible (mobile bed zone) of the river. The much wider overbanks outside the channel convey a relatively small portion of the flow. This result is reasonable in that the defined channel, being relatively narrow compared to the floodplain, will convey higher velocity flow at greater depth and thus will be subject to erosion of the river bed during floods. The smaller portion of flow in the overbanks will be lower velocity and shallower, thus being conducive to sediment deposition in those areas.

Figure 49 shows the mean velocity of flow in the defined channel. At low flow, the velocity is between 4 to less than 8 feet per second (fps) with a typical velocity of 4 to 5 fps. At high flow, the velocity is between 6 to about 13 fps with a typical velocity of 8 to 10 fps. The velocity during large floods is about 6 to 7 fps in the wide channel of the river between stations 189 and 192. Such velocities are more than adequate to entrain and transport the predominant sand of the river bed, but the velocities are not exceedingly

Flood Control District
of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:

Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

- Bank Station
- Centerline
- Cross Section
- A
- AE
- AH
- FW

N

0 0.25 0.5 1
Miles

Notes:

Title:

FIGURE 46
EL RIO PROJECT AREA - 2004 AERIAL PHOTOGRAPHY WITH HEC-6T GEOMETRY INPUT

Produced by: BGS

Date: 9/16/2005

Figure 47
Channel width in the El Rio HEC-6T model

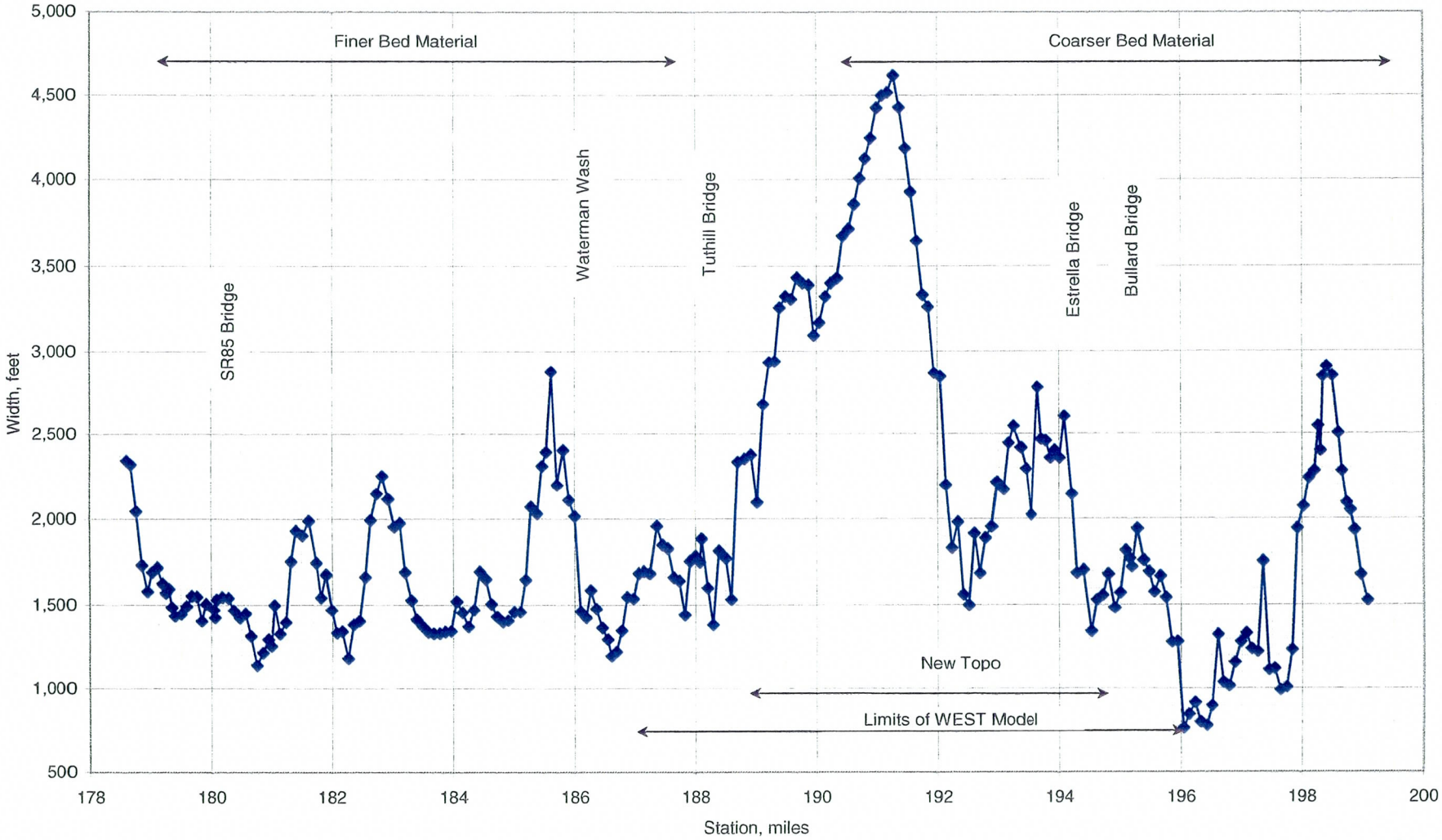


Figure 48
El Rio HEC-6T Model Results
Percentage of flow that is conveyed in the channel

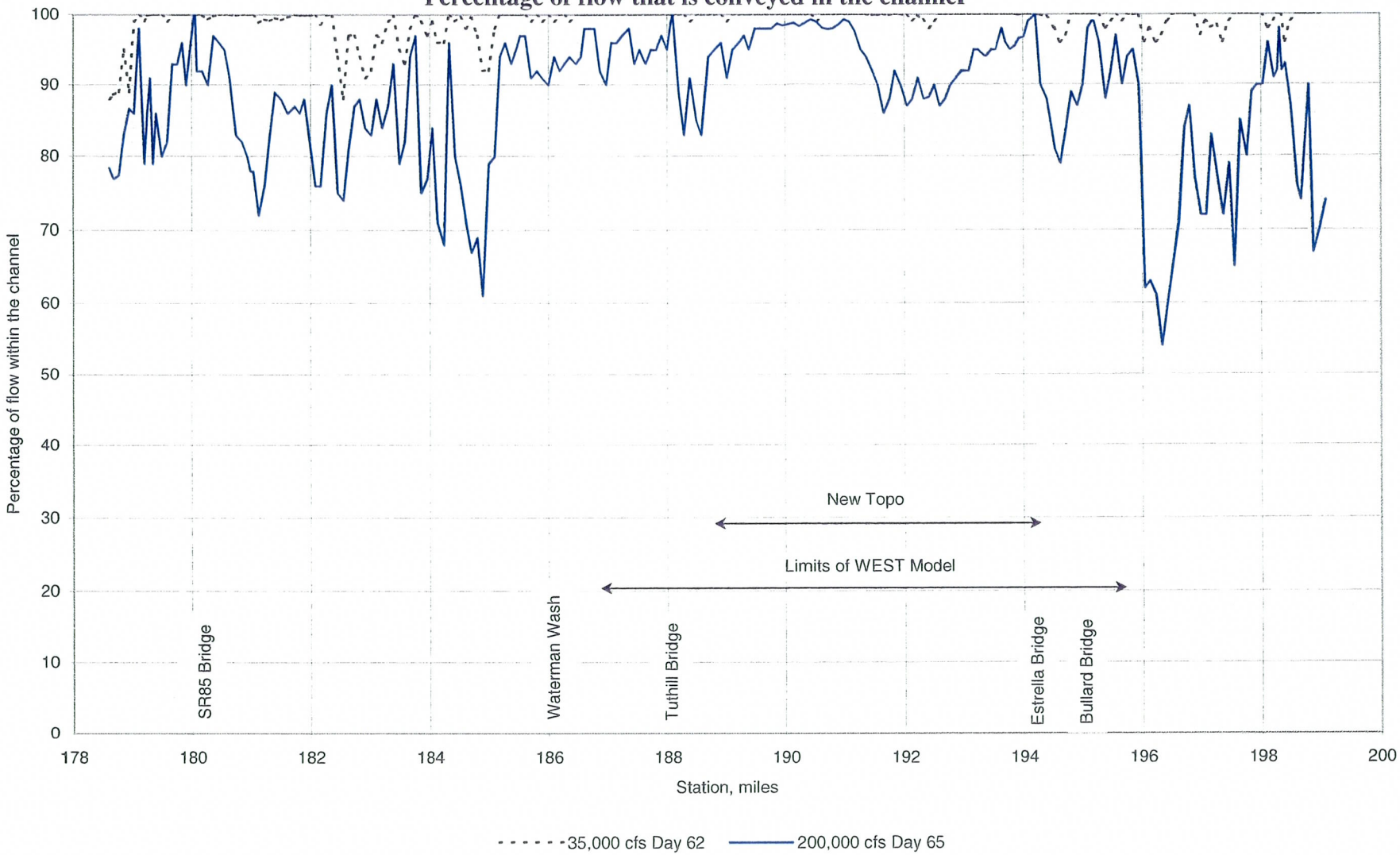
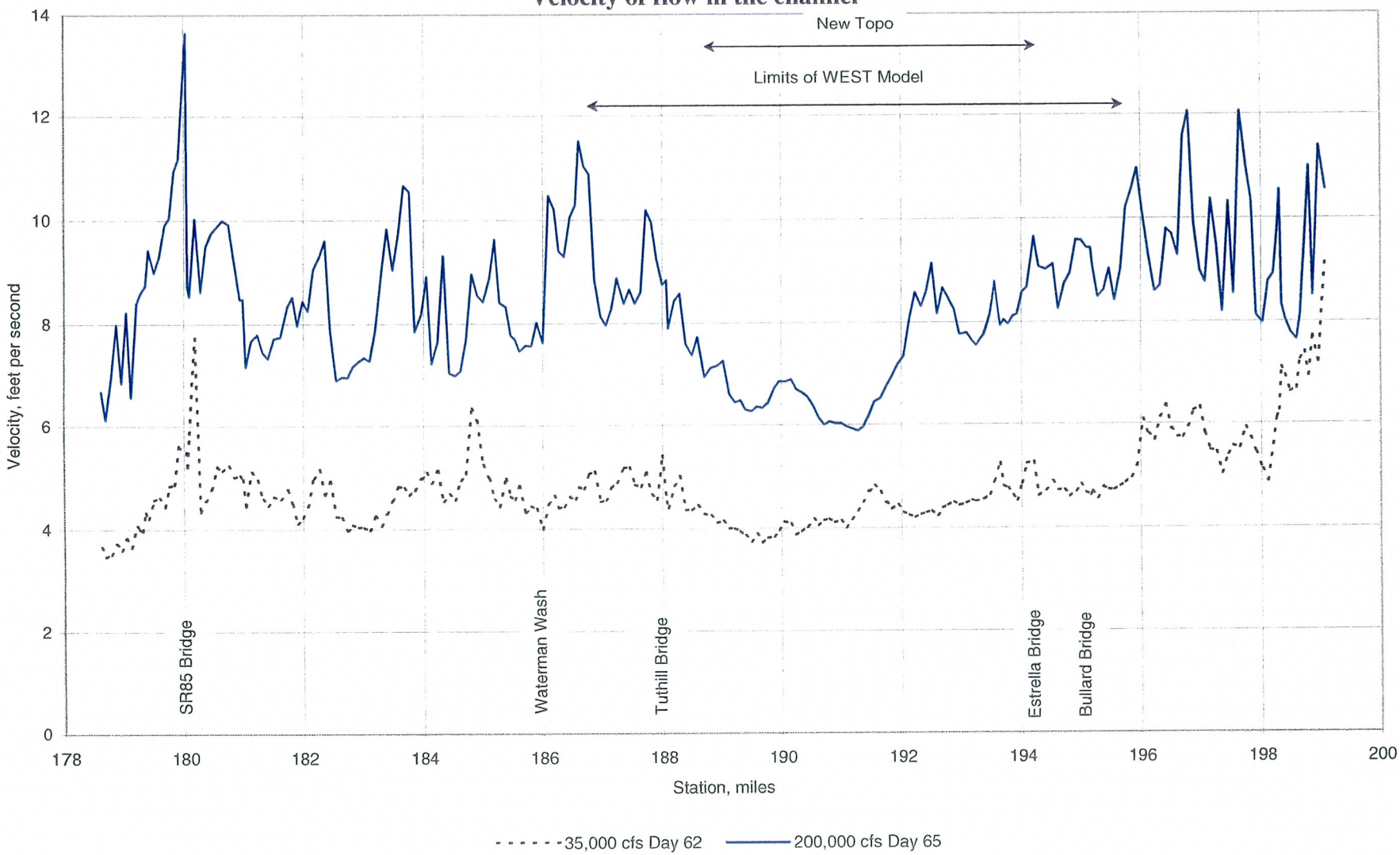


Figure 49
El Rio HEC-6T Model Results
Velocity of flow in the channel



high to produce severe scour depths during floods. The narrow approach channel to the SR 85 bridge has high velocity at both low and high flows.

VERTICAL PROFILE COMPARISONS

Figure 50 shows the longitudinal profile of the modeled reach of the Gila River. Two lines are shown; one is the profile of the channel at the start of the hydrologic simulation, and second is the profile of the channel at the completion of the HEC-6T hydrologic simulation. For both profiles, the bed elevation is the average elevation of the bed between the bank stations. The following are noted:

- The river channel between stations 189 and 194 is a reach of virtually no bed elevation change for all flood conditions. It is noted that this is an exceptionally wide channel zone (Figure 47) and low velocity (Figure 49).

- Downstream of station 189 is a reach that is prone to bed scour and possible long-term degradation of 5 feet or more.

- Between stations 194 and 195.5 is a zone of relatively small bed elevation change.

- A zone of local scour of about 5 feet occurs near station 196. That is caused by the narrow channel width (Figure 47) at that location, which is due to the restraining bank rock outcrop on the south and the sediment deposits from the Agua Fria River pushing into the Gila River from the north.

- The rise in bed elevation from station 198.5 to 199 is caused by the model boundary condition. The sediment transport rate, as calculated by the model, is less than the inflowing bed material load. A portion of the incoming sediment is deposited until the calculated sediment transport rate stabilizes to the incoming sediment load.

Figure 51 shows the average change in bed elevation for three discharges. The 70,000 cfs is the first discharge in the HEC-6T hydrologic sequence. That line shows the vertical response that the river would experience (compared to the existing river bed) if a flood discharge of 70,000 cfs would occur for 1 day (24 hours). Notice that scour depths of generally less than two feet can be expected.

The scour depths at 132,000 cfs (the 1993 flood) and 200,000 cfs (the 100-year flood, 1-day mean discharge) are fairly similar in magnitude. For unusually large floods, general scour depths of as much as 8 feet can be expected with a typical general scour depth of about 5 feet.

The region from stations 189 to 194 shows little scour and some deposition across the channel. That is the exceptionally wide reach of river that shows little vertical instability. The HEC-6T model results, along with interpretation of aerial photography, indicates that

Figure 50
El Rio HEC-6T Model Results
Longitudinal profiles for the Gila River in the El Rio study reach

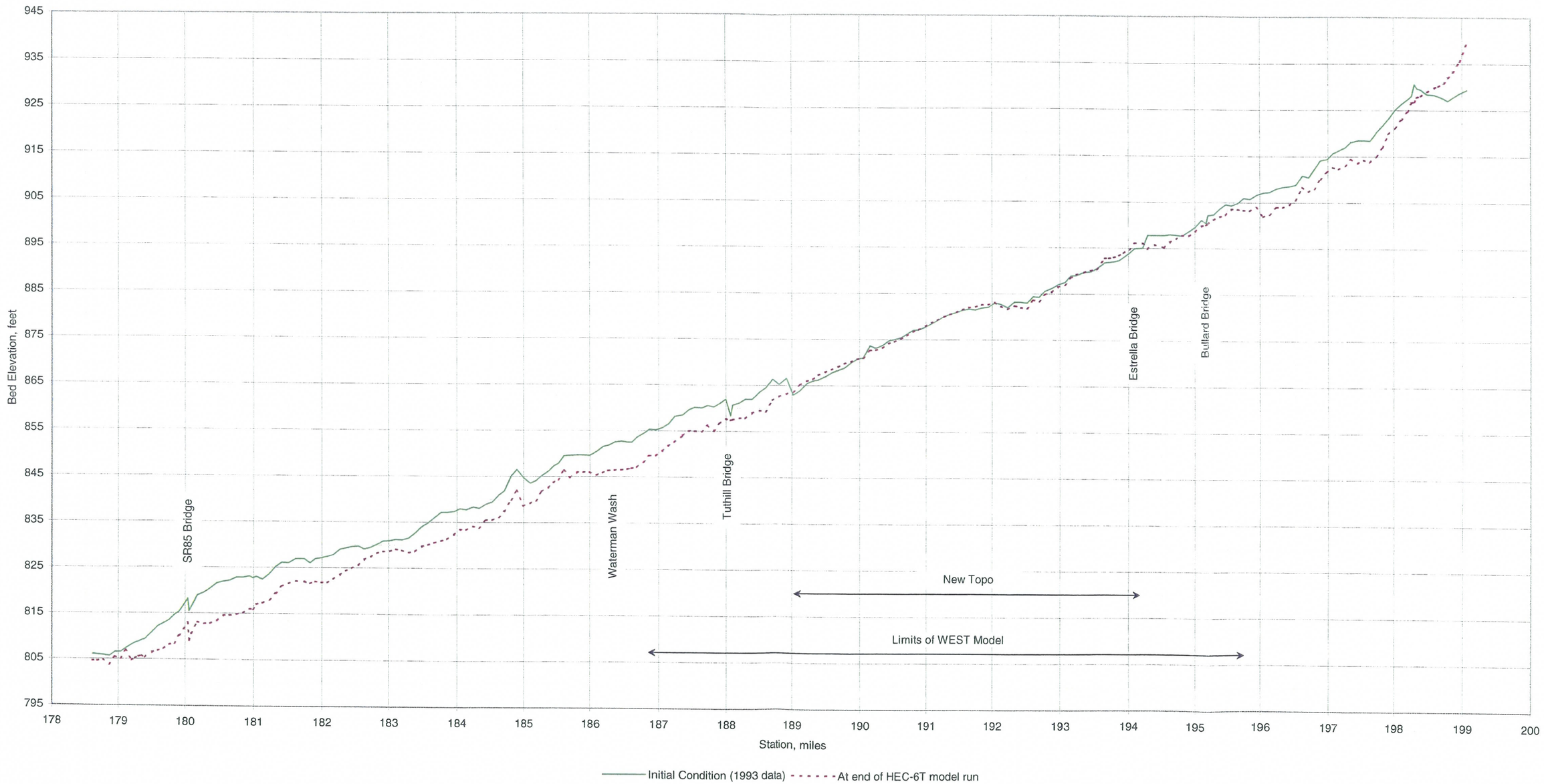


Figure 51
El Rio HEC-6T Model Results
Bed elevation change at various discharges

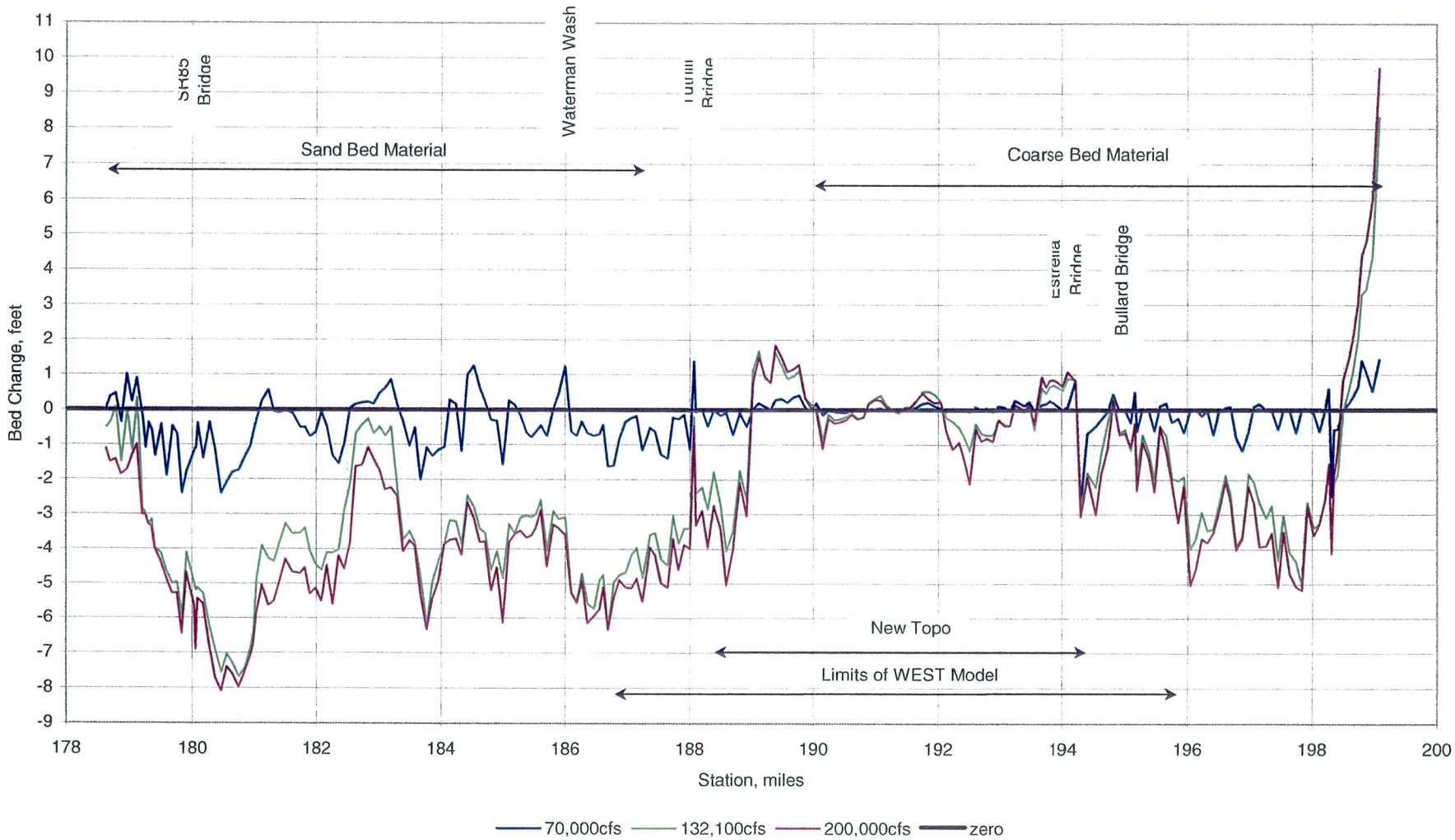


Figure 52
El Rio HEC-6T Model Results
Maximum and minimum bed elevation change

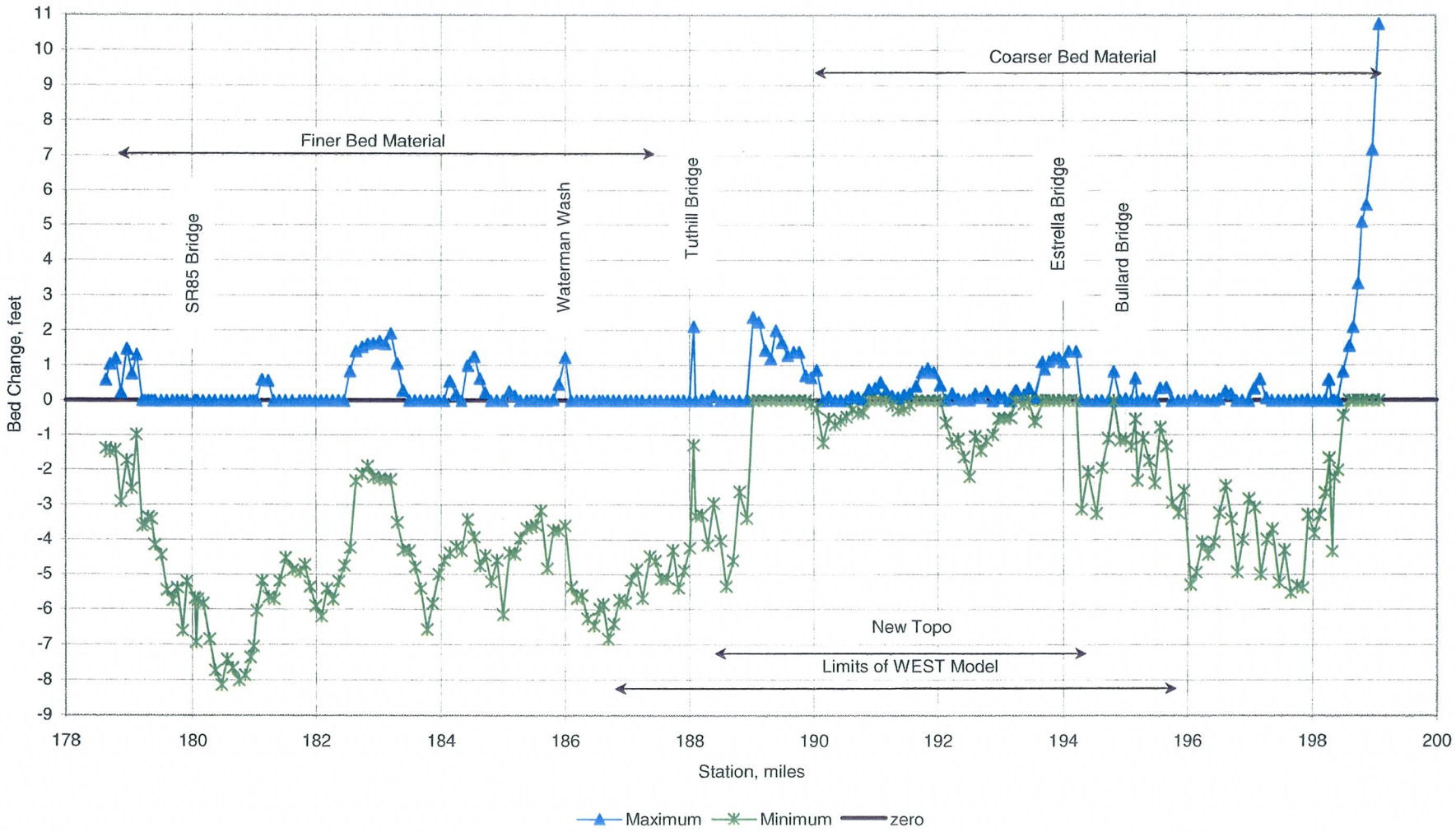


Figure 53
El Rio HEC-6T Model Results
Comparison of total sediment load concentration for inflowing and outflowing sediment from the model to USGS data

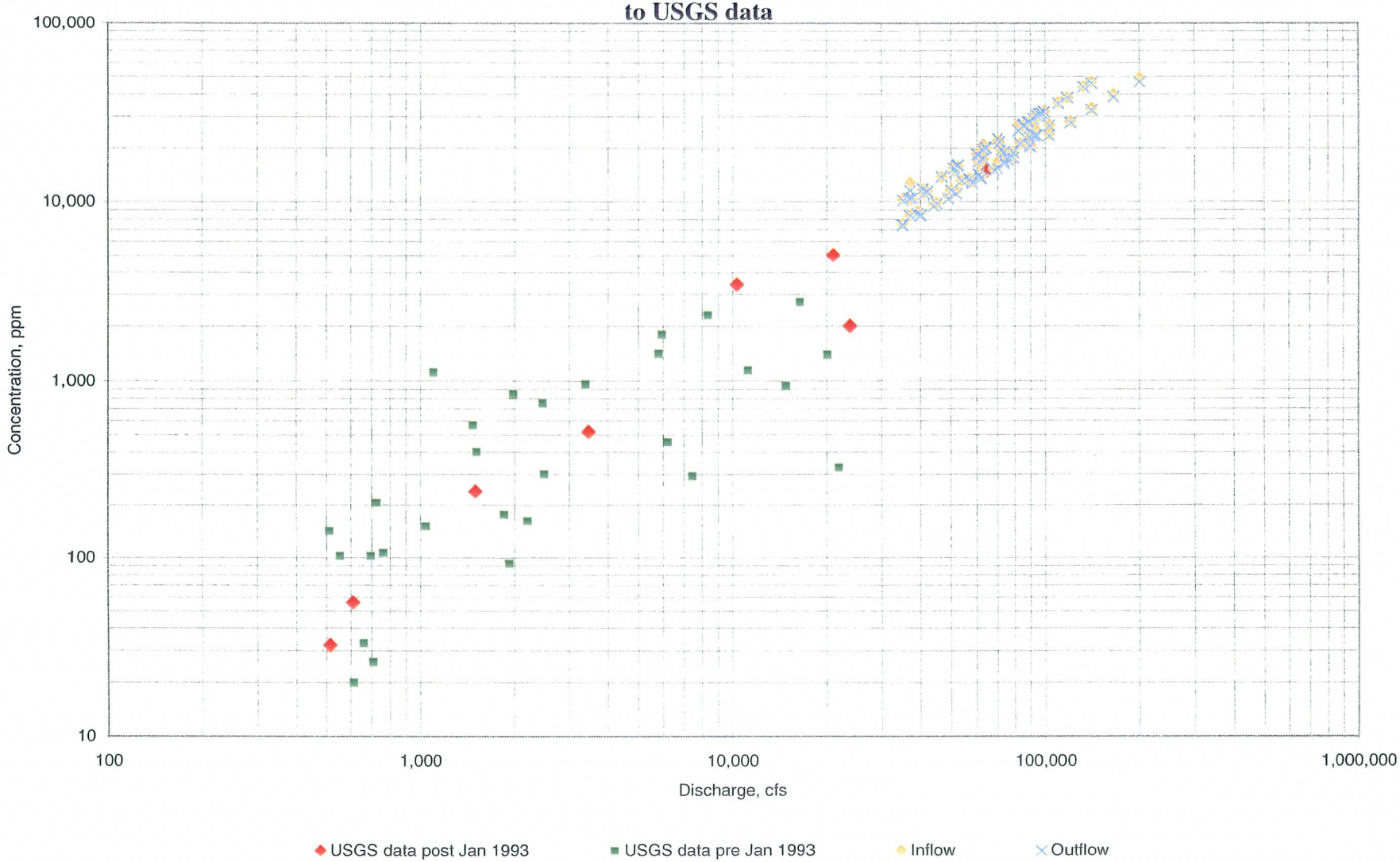
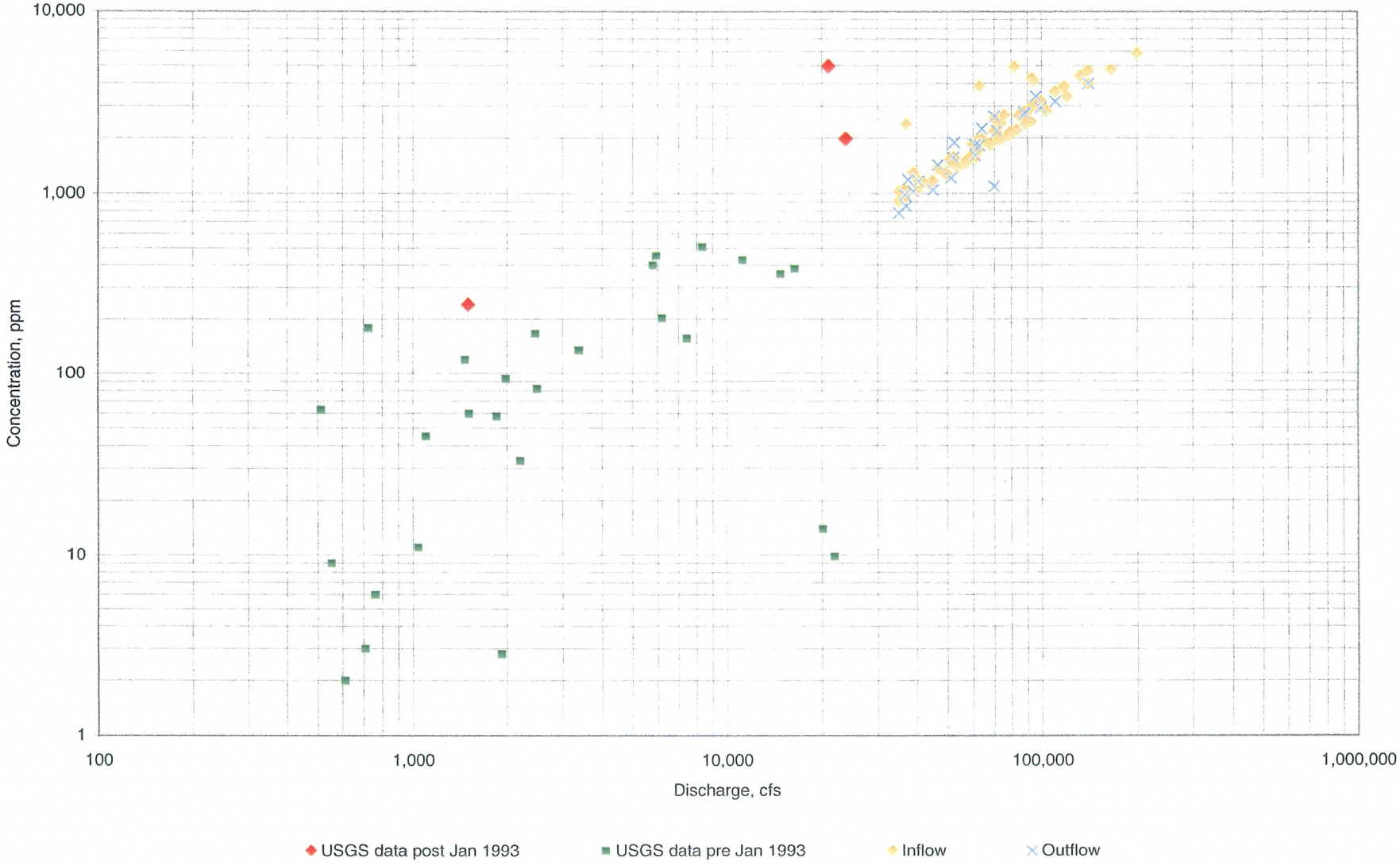


Figure 54
El Rio HEC-6T Model Results
Comparison of sand concentration for inflowing and outflowing sediment from the model to USGS data



that reach of river is vertically stable (little tendency for scour and/or fill) but will tend to migrate laterally and have multiple main channels.

Figure 52 shows the maximum and minimum bed elevation changes at each model cross-section for the entire model hydrologic sequence. A station that shows a zero for the maximum is a section that only experiences erosion during floods. A station that shows a zero for the minimum is a section that only experiences deposition during floods. There are some stations (for example from 182.5 to 183.5) that can experience either erosion (scour) or deposition (fill) during floods.

The maximum bed elevation change at station 198.5 to 199 of 11 feet, as shown in Figure 52, is not interpreted to represent actual conditions during any flood. That model deposition is a boundary effect as previously discussed.

In interpreting Figures 51 and 52, it must be remembered that the hydrologic sequence that is modeled is a continuous string of 1-day flood discharges exceeding 35,000 cfs. In reality, floods of several days to a couple weeks duration would be separated by long periods, often of numerous years or even decades, of low flow (less than 35,000 cfs). During those periods of low flow, it is likely and virtually certain, that reaches of the river that experience erosion would fill back to an equilibrium profile prior to the onset of the next flood. That fill material would subsequently be eroded by the next larger flood.

SEDIMENT TRANSPORT ANALYSIS

The sedimentation of the Gila River through the El Rio study reach was evaluated by use of an HEC-6T model. The results of that model are presented in various figures to illustrate the magnitude of sedimentation that can be expected. The sedimentation varies temporally in response to natural floods that randomly occur in magnitude and duration. The sedimentation also varies spatially throughout the study area as influenced by geologic conditions, geometry of the river section, bed material size gradation, vegetation on the overbanks and the hydraulic impact of four existing bridges in that study reach.

The HEC-6T produces voluminous output that is best illustrated and evaluated by graphs of that output. Because the mechanics of sediment transport are dramatically different for the wash load and the bed material load, results are often presented for total sediment load, which is the sum of wash load and the bed material load, and as sand, which represents the bed material load.

Figures 53 and 54 present the concentrations of total sediment load and sand load, respectively. Those concentrations are of the sediment loads inflowing at the upper end and outflowing at the lower end of the model. Sediment concentration is not reported in the HEC-6T output and it is calculated by

$$C = \frac{Q_s}{0.0027 Q_w}$$

where C is concentration in parts per million (ppm) or milligrams per liter (mg/*l*)

Q_s is sediment load in tons per day, and

Q_w is water discharge in cfs.

In those figures, the concentration of suspended sediment load and the concentration of suspended sand load, as reported by the USGS for the Gila River at Gillespie Dam, are shown for comparison. Note that almost all of the sediment concentrations as measured and reported by the USGS are for discharges less than 35,000 cfs. Therefore, the interpretation of the model results in comparison to recorded data must be made by reasonable extrapolation of the trend of the recorded data.

In Figure 53, the concentrations of total sediment load vary from about 7,000 ppm to about 50,000 ppm. The maximum recorded concentration is about 16,000 ppm at about 65,000 cfs. The concentration of total sediment inflow is about equal to total sediment outflow. The HEC-6T model results agree very favorably with the available data for the river.

Figure 54 is similar to Figure 53 except that it represents only the sand load. Notice that the concentration scale of Figure 54 is one-tenth the scale of Figure 53, indicating that, in general, the sand load of the Gila River is 10 to 20 percent of the total sediment load. The concentrations of sand load from the HEC-6T model range from about 700 ppm to about 6,000 ppm. As with Figure 53, the concentrations from the model output are for the inflowing and outflowing sand loads.

Figures 53 and 54 indicate that, in general, the inflowing sediment loads (both total load and to a lesser extent the sand load) are equal to the outflowing sediment loads. That is, the river is in near dynamic equilibrium; on the average, sediment inflow equals sediment outflow. As will be subsequently illustrated, that does not preclude the fact that certain portions of the river experience erosion while other areas experience deposition.

Figures 55 and 56 show the HEC-6T model results for total sediment load and sand load, respectively, compared to the USGS data. In those figures, the model results are shown for selected discharges from 35,000 cfs to 200,000 cfs. Again, note that the concentration scales of the two figures are different illustrating that the sand load is a fraction of the total load. The total load concentrations at low flow (35,000 cfs) are about 6,000 ppm to about 8,000 ppm. At high flow (200,000 ppm), the concentration ranges from about 40,000 ppm to about 50,000 ppm.

Figure 56 illustrates the spatial variability of bed material transport throughout the river. At 61,000 cfs, the sand concentration can be as low as about 300 ppm at a station in the river and as high as about 2,500 ppm elsewhere. That figure also illustrates the dramatic difference in sand transport rates as a function of flood discharge. A small flood (35,000 cfs) may transport sand at 600 ppm to over 1,000 ppm, but a large flood (200,000 cfs) would have concentrations in the 3,000 ppm to 6,000 ppm range.

Figures 57 through 62 illustrate sediment concentrations (total load and sand load) at three selected cross-sections; one cross-section in the upper reach, one in the middle

Figure 55
El Rio HEC-6T Model Results
Comparison of total sediment load concentration from the model to USGS data at various discharges

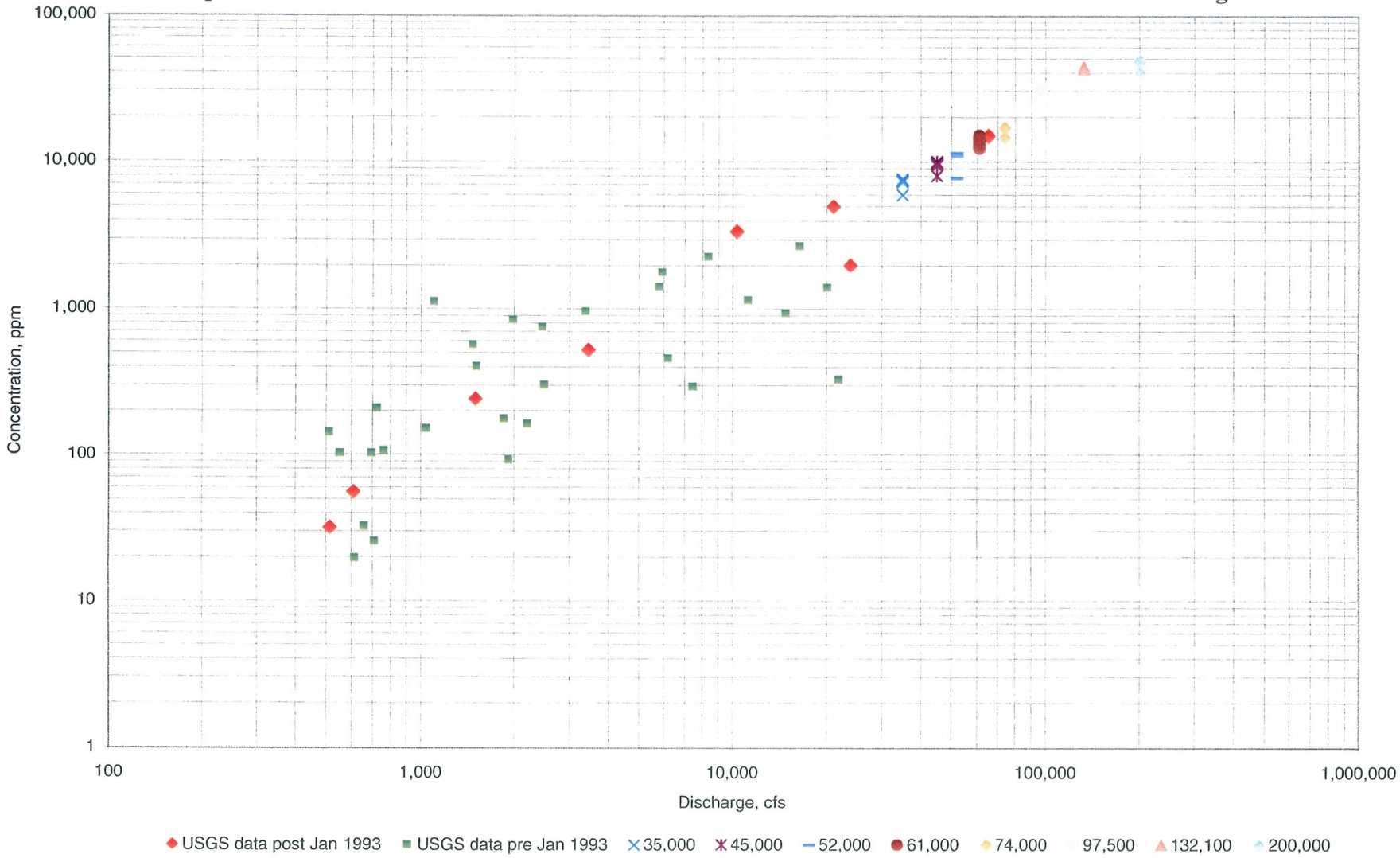


Figure 56
El Rio HEC-6T Model Results
Comparison of sand concentration from the model to USGS data at various discharges

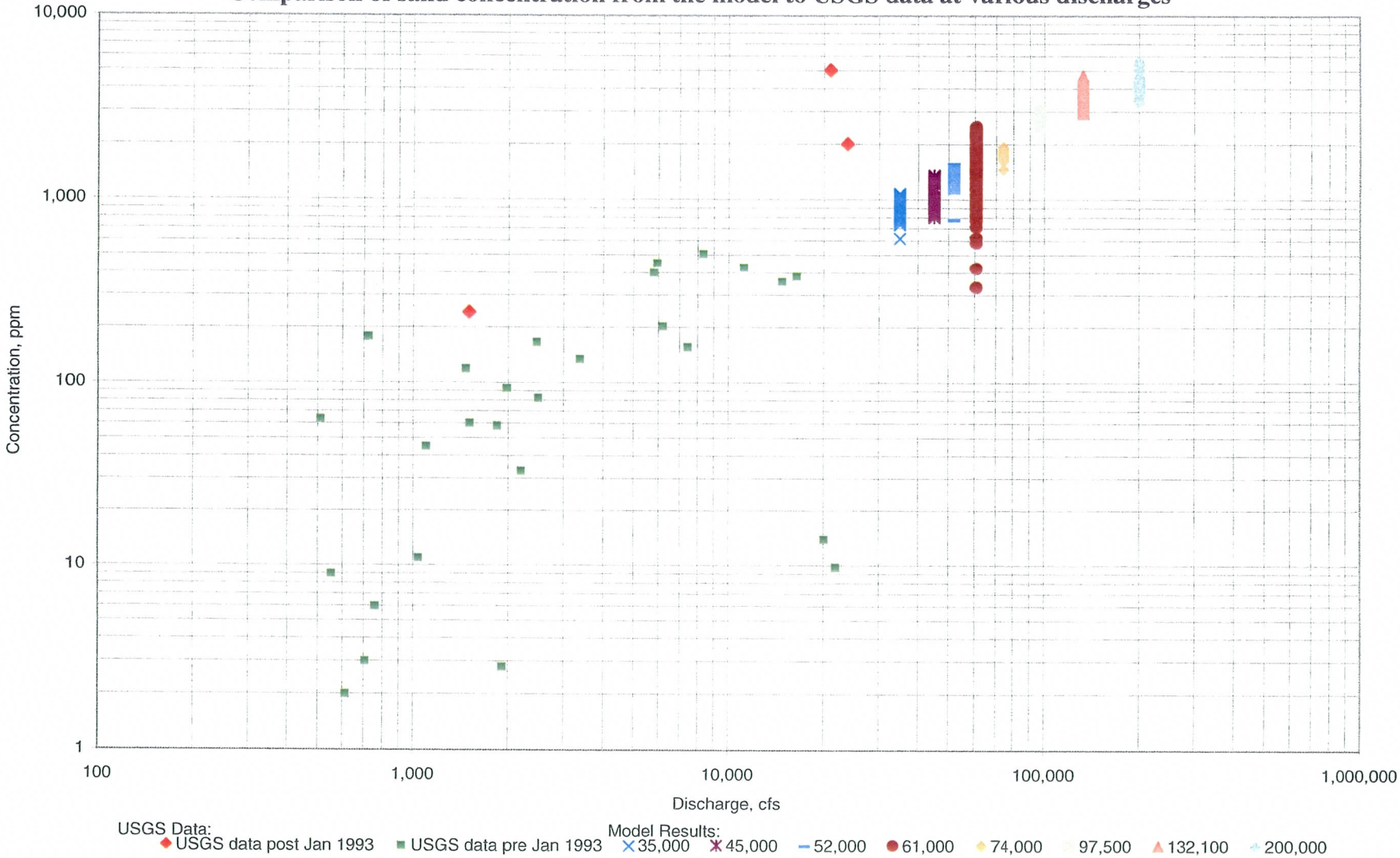


Figure 57
El Rio HEC-6T Model Results
Comparison of model results for total sediment load concentration to USGS data at a cross section in the upper portion of the study area

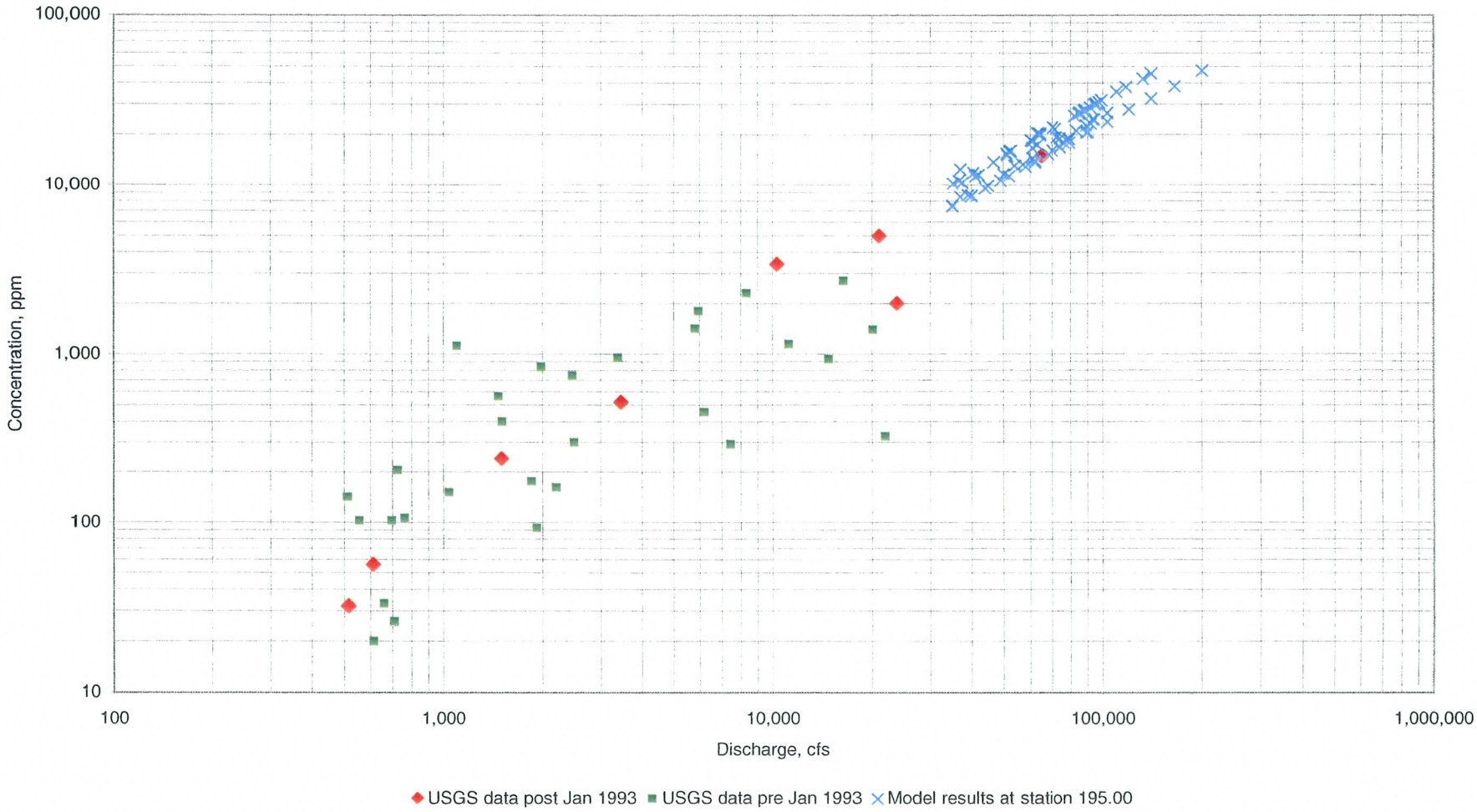


Figure 58
El Rio HEC-6T Model Results
Comparison of model results for sand concentration to USGS data at a cross section in the upper portion of the study area

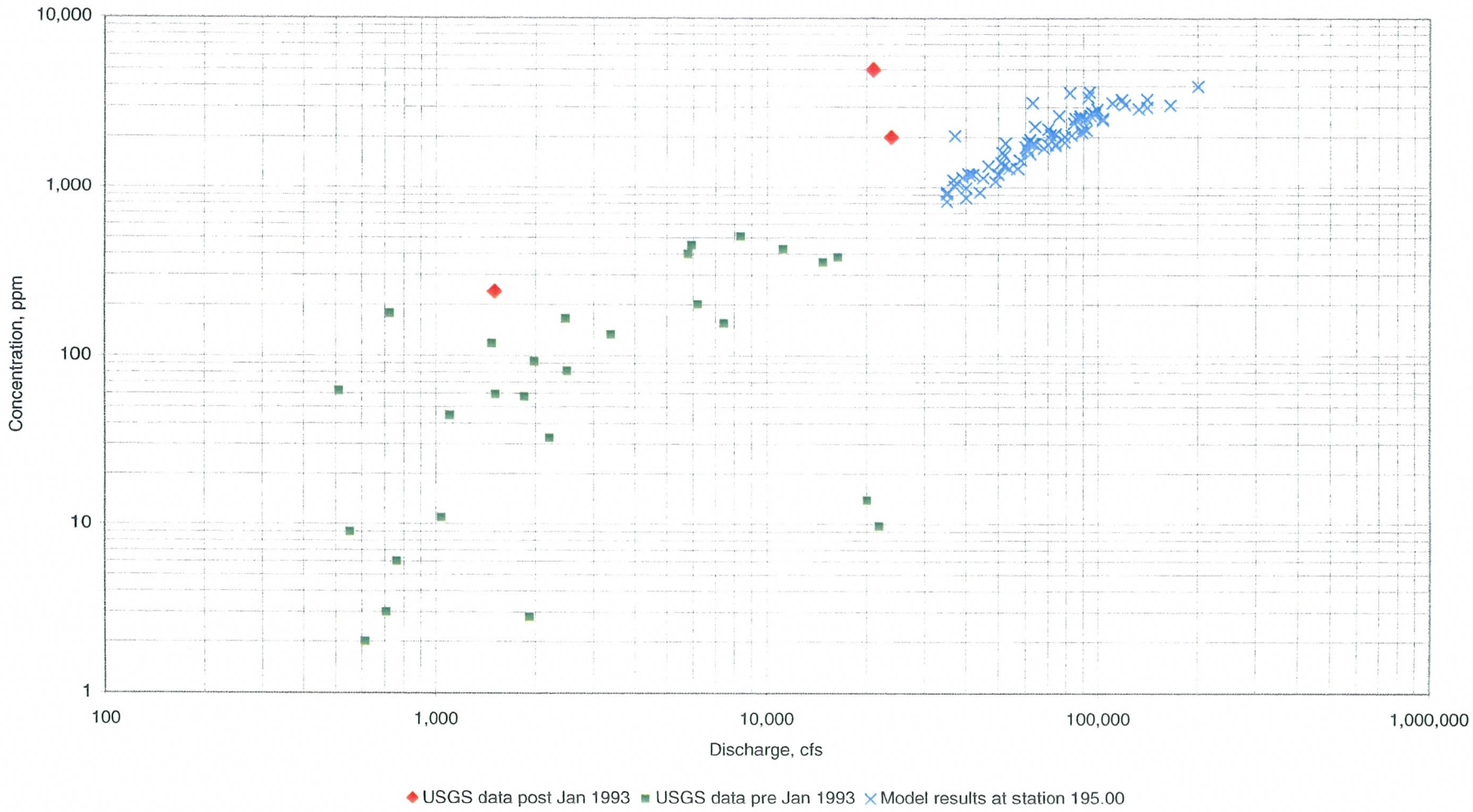


Figure 59
El Rio HEC-6T Model Results
Comparison of model results for total sediment load concentration to USGS data at a cross section in the area of new topography within the study area

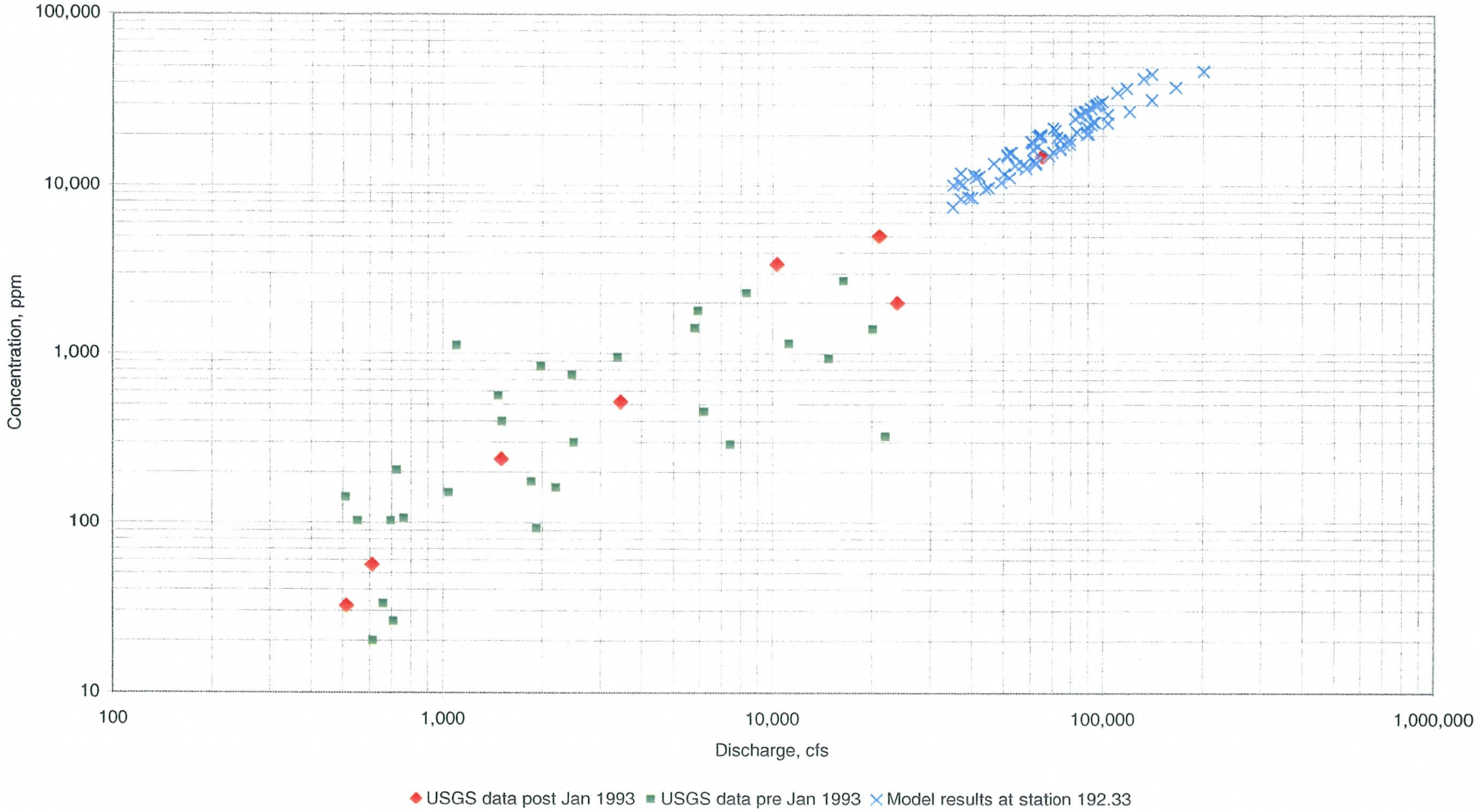


Figure 60
El Rio HEC-6T Model Results
Comparison of model results for sand concentration to USGS data at a cross section in the area of new topography within the study area

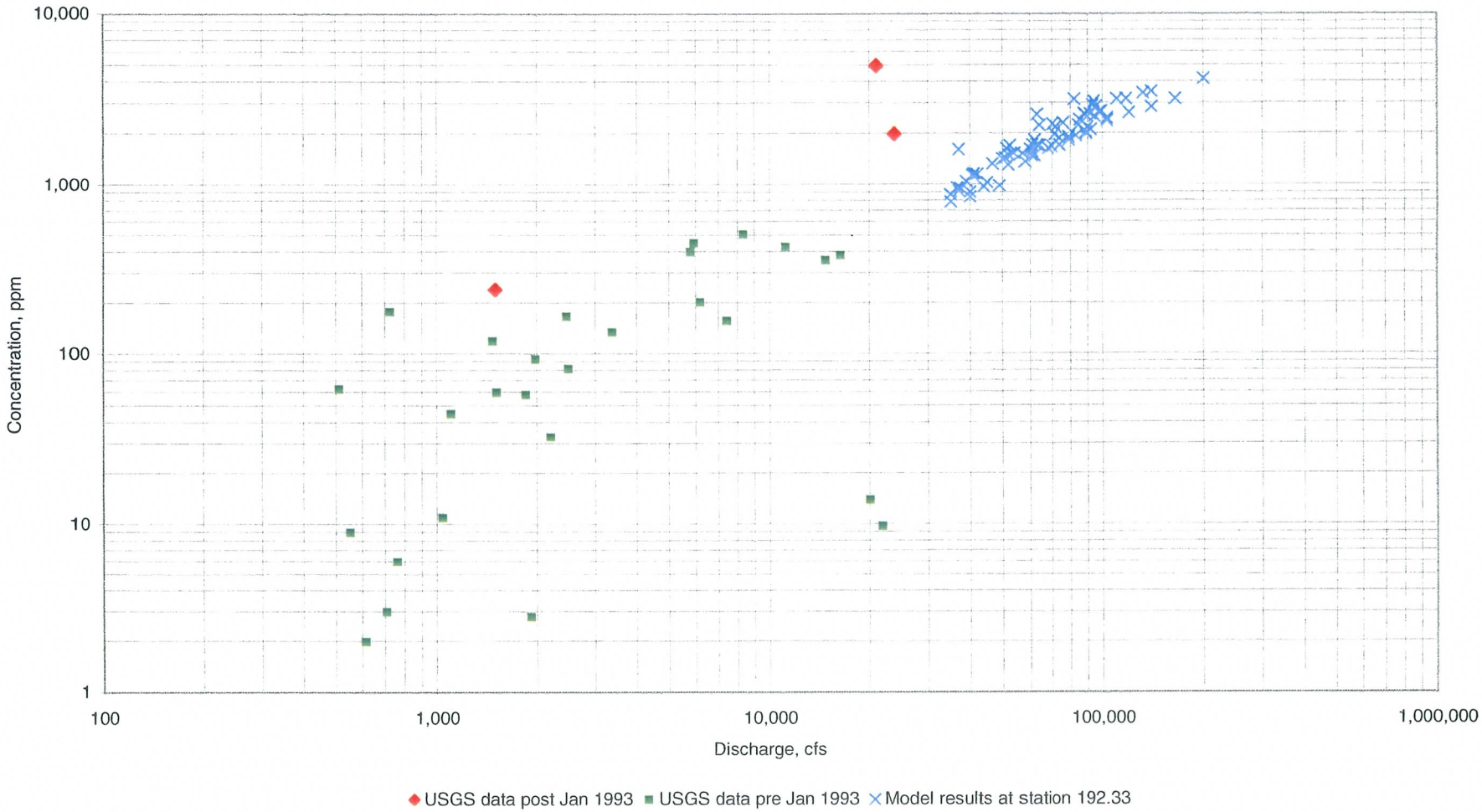


Figure 61
El Rio HEC-6T Model Results
Comparison of model results for total sediment load concentration to USGS data at a cross section in the lower portion of the study area

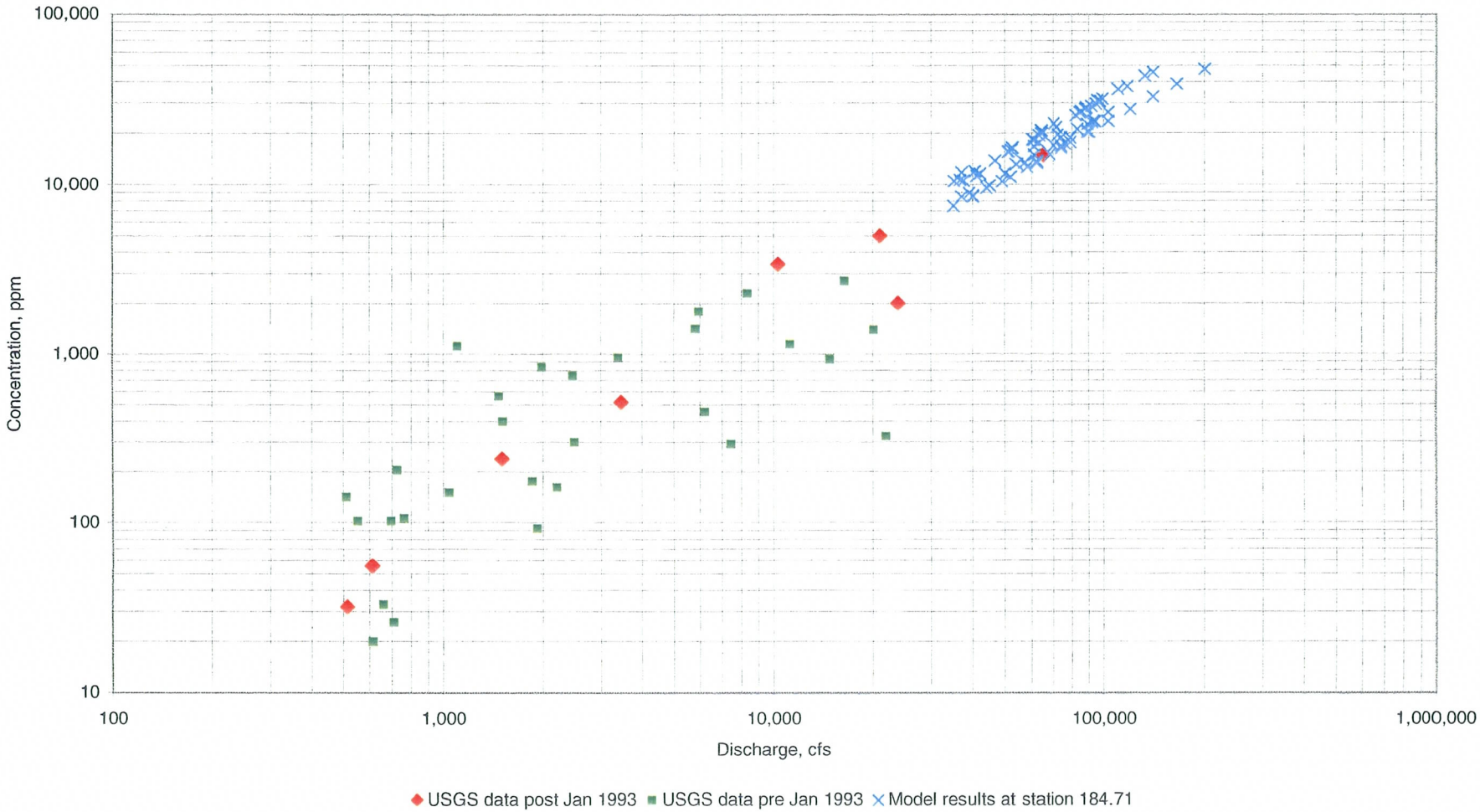
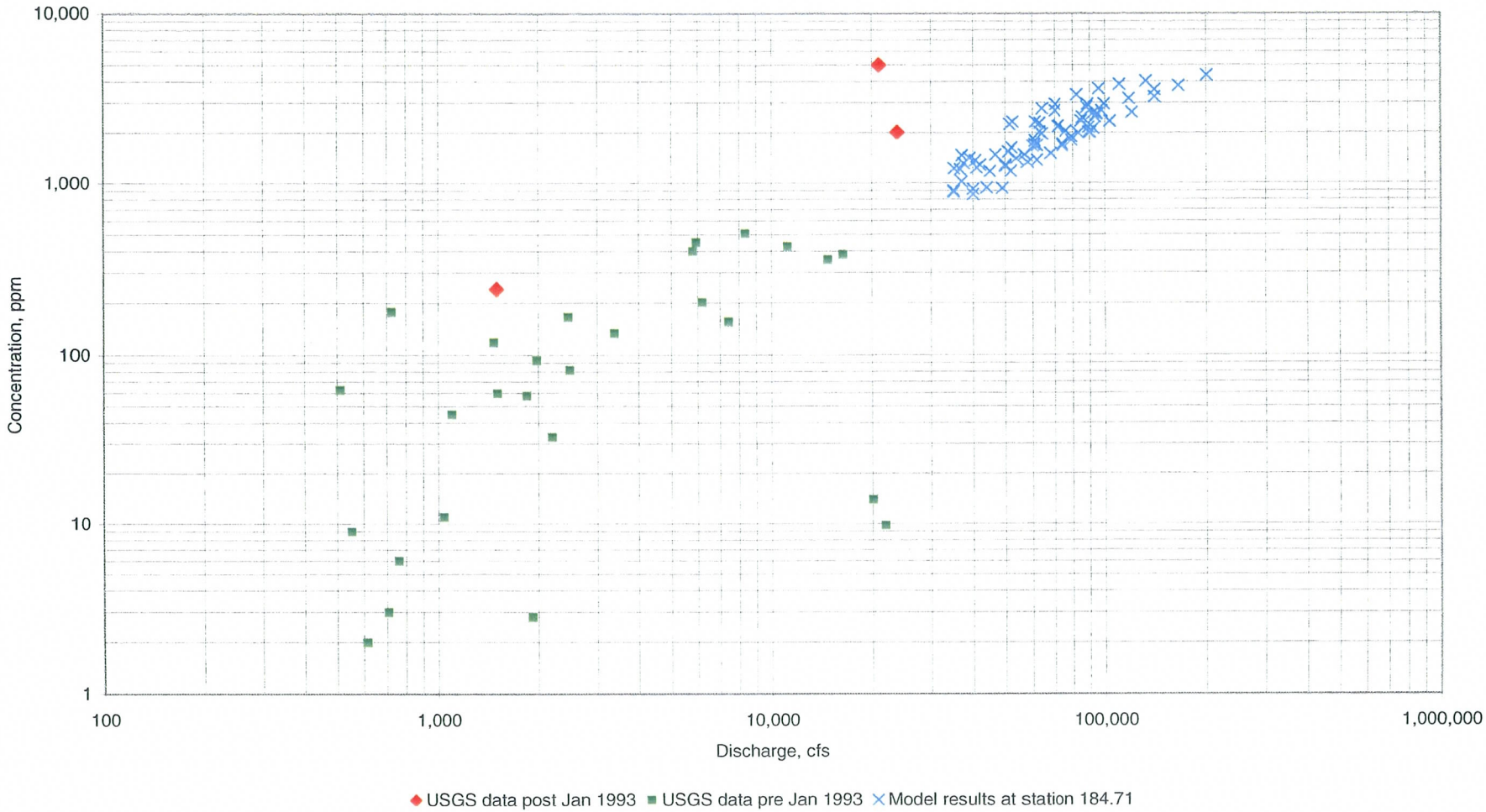


Figure 62
El Rio HEC-6T Model Results
Comparison of model results for sand concentration to USGS data at a cross section in the lower portion of the study area



reach where new topography is used, and one in the lower reach. Those figures demonstrate that the total sediment load essentially passes through the river, and that the sand load varies according to location (station) and flood magnitude.

Figure 63 is a graph of the total sediment load that passed through each section of the river for the entire hydrologic simulation period. The higher sediment load at the upper end is to be disregarded because it reflects the inflowing sediment boundary condition. The total sediment load ranges from about 345 million tons to about 351 million tons. To place that sediment load in perspective, if that sediment load was to enter Painted Rock Dam on the Gila River downstream of the El Rio study area, it would occupy a volume of about 200,000 acre-feet of storage in Painted Rock Reservoir. Recently, the Corps of Engineers (Bryant and others, 1999) estimated that about 157,000 acre-feet of sediment deposition occurred in Painted Rock Reservoir from 1953 through 1993. The HEC-6T model predicts a total sediment load of 200,000 acre-feet using a hydrologic simulation of floods from 1921 through 2004 plus a synthetic 100-year flood. The Corps of Engineers estimate of 157,000 acre-feet for Painted Rock Dam for 1953 through 1993 provides a reasonable check on the results of the HEC-6T model.

Figure 64 is a graph similar to Figure 63 except that it is for the bed material load. Notice that the sediment load scale for Figure 64 is about one-tenth that of Figure 63. The graph at the right end is to be disregarded as a boundary effect. Figure 64 indicates that the Gila River will generally undergo deposition from station 198 to station 189. The river will undergo erosion from station 189 to station 185. From station 185 to station 183.5 is a reach of neither erosion nor deposition. From station 183.5 to station 182 the river is subject to deposition and from station 182 to the SR 85 bridge the river is erosional. It is noted that these tendencies for erosion or deposition are for the defined channel of the river and these tendencies will not necessarily be the same in the overbanks.

Figure 65 represents the sediment transport characteristics as accumulated sediment deposited in the river measured from the upstream end. In that figure, a slope of the line upward from right to left indicates deposition while a slope of the line downward from right to left indicates erosion. Starting from the right, the first 3 million tons should be disregarded as a boundary effect. From station 198 to station 189 the river is expected to experience about 5 million tons of sediment deposition over a long-term cycle of approximately 100 years. Downstream of station 189, through the Tuthill Bridge, past the confluence of Waterman Wash and to about station 185 the river will lose about 4 million tons of sediment during that time cycle. The river channel will tend to scour for about 2 miles upstream of the SR 85 bridge. Again, it is noted that the erosion and deposition tendencies that are shown in Figure 65 are for the relatively narrow channel of the river and do not necessarily represent conditions in the overbank floodplains.

Overall, the HEC-6T model of the El Rio study area shows that the river channel has a small (about 1 million tons) tendency for deposition to occur, but considering the inherent assumptions and limitations of sediment transport modeling, the river is in dynamic equilibrium with the long-term sediment inflow equaling the long-term sediment outflow.

Figure 63
El Rio HEC-6T Model Results
Total sediment load passing each section at the end of the hydrologic simulation

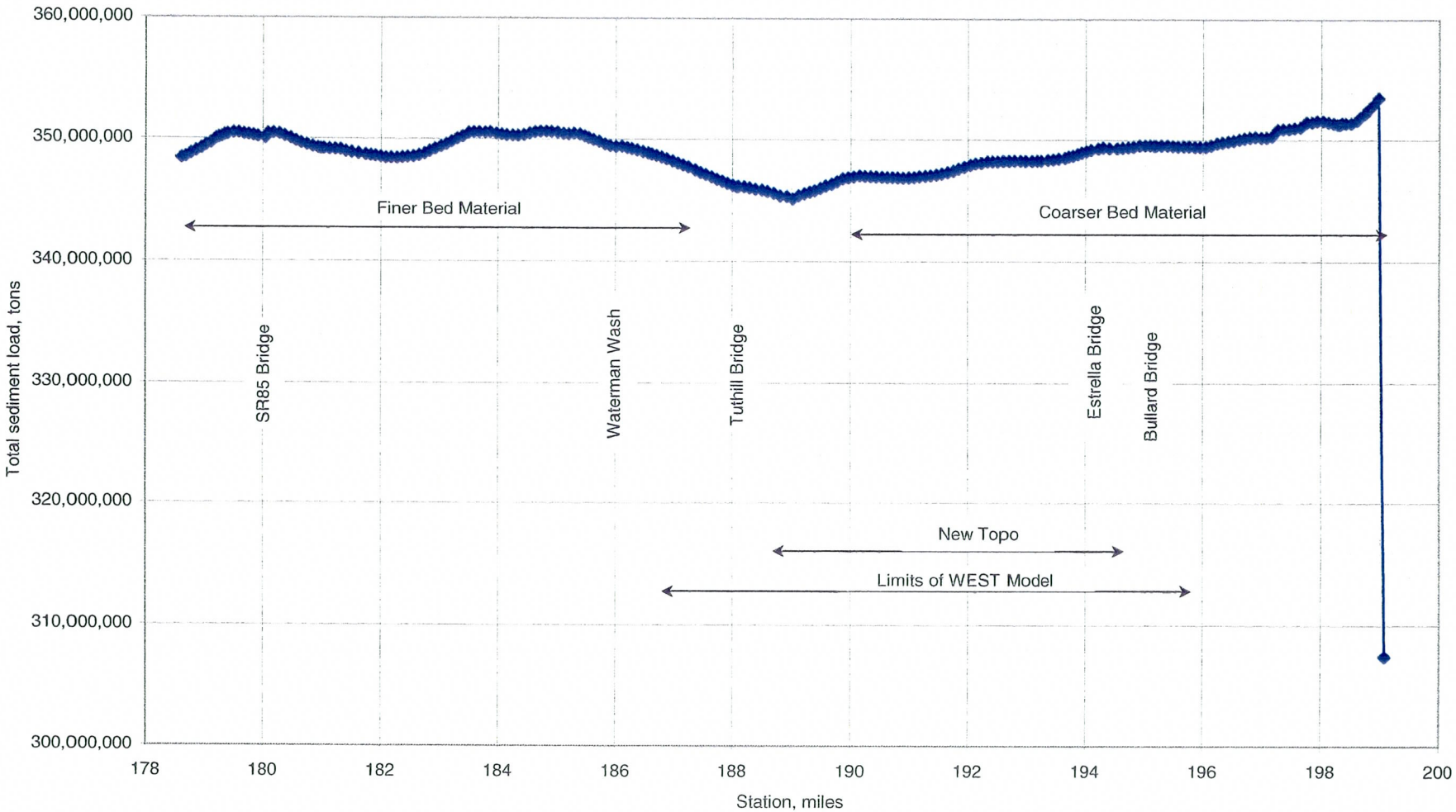


Figure 64
El Rio HEC-6T Model Results
Bed material load passing each section at the end of the hydrologic simulation

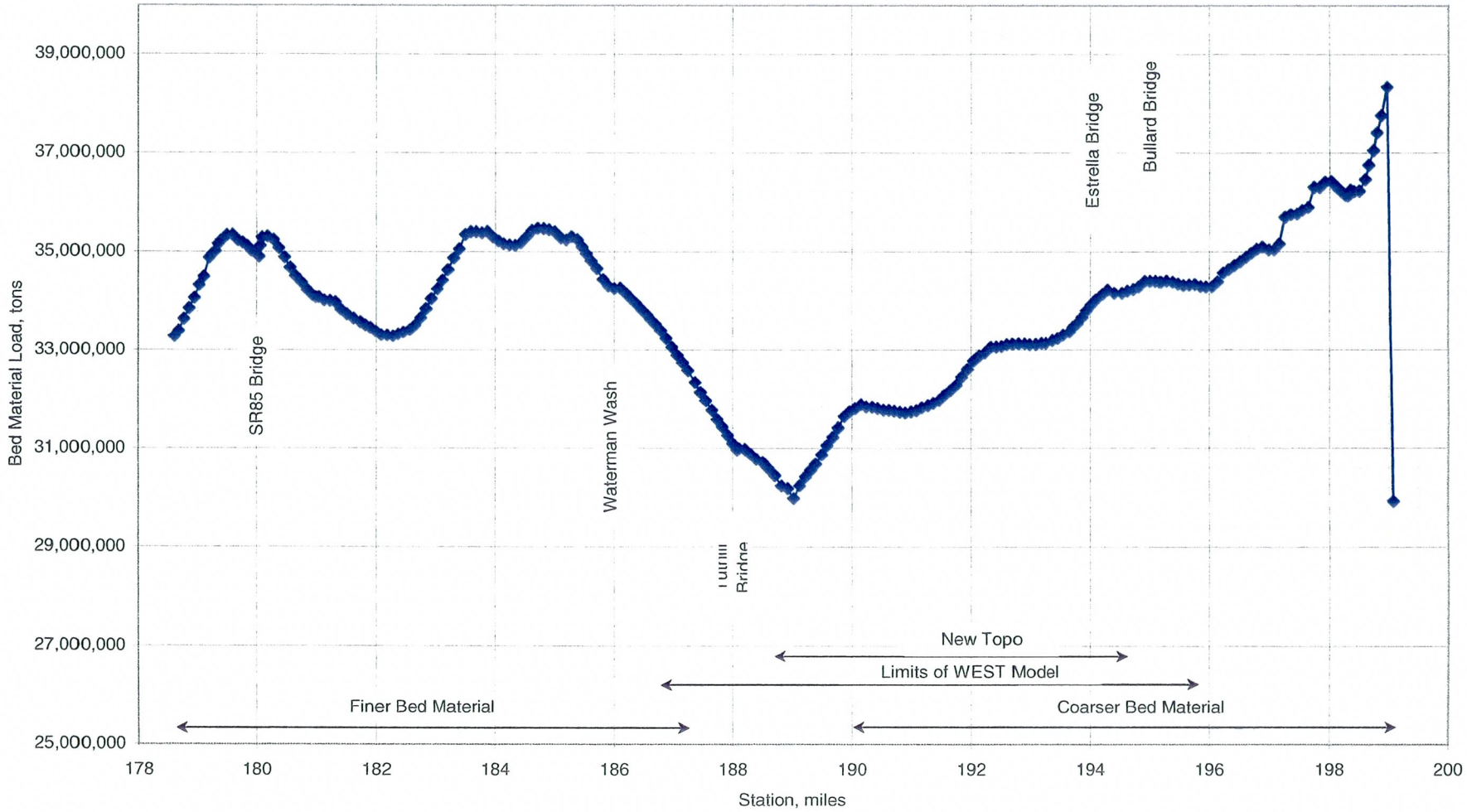
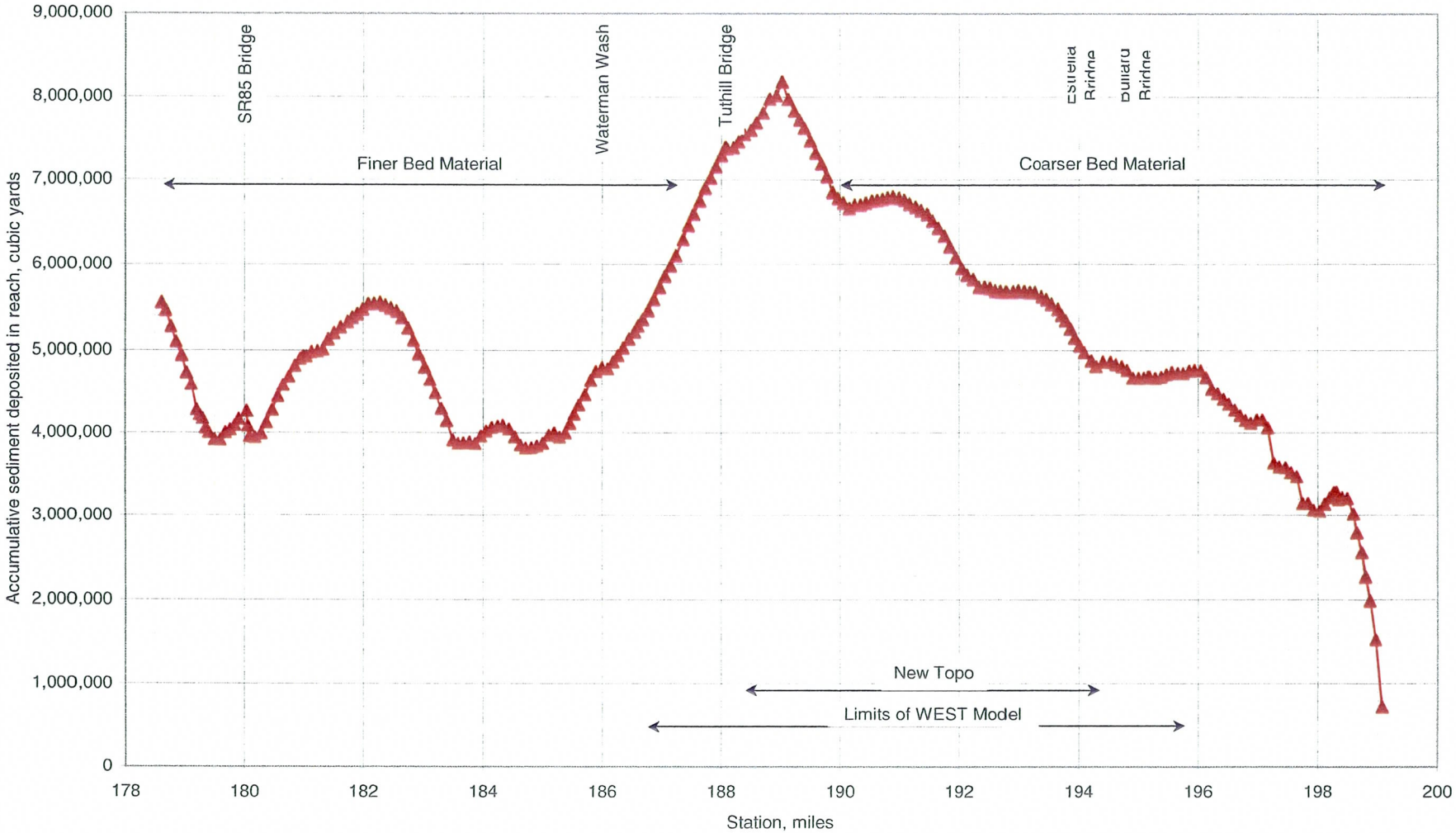


Figure 65

El Rio HEC-6T Model Results- Accumulative sediment deposited in the river upstream of each station at the end of the hydrologic simulation



SUMMARY OF HEC-6T MODELING OF EXISTING CONDITIONS

1. The majority of flood flow, and hence sediment transport, is contained in a relatively narrow channel.
2. Erosion and deposition varies with the magnitude of the flood.
3. Erosion and deposition varies along the length of the El Rio study reach, some reaches are prone to erosion and other reaches are prone to deposition.
4. The El Rio study reach is in near sediment equilibrium with sediment inflow equaling sediment outflow.
5. The volume of sediment transported through the river for the hydrologic sequence of floods from 1921 through 2004 plus a synthetic 100-year flood is about 200,000 acre-feet. That volume agrees well with the 157,000 acre-feet of deposition in Painted Rock Reservoir for the period from 1953 through 1993.
6. Long-term deposition is expected in the river reach from station 189 to station 194. That is a region having a wide channel in the river.
7. There are short reaches of long-term erosion in the river.
8. General scour of as much as 8 feet can be expected in the channel of the river during floods.

MODEL INPUT SENSITIVITY ANALYSIS

PURPOSE OF THE SENSITIVITY ANALYSIS

Sensitivity analyses of input into the existing condition HEC-6T model (base model) was performed to assess if variability in model input would substantively change the model results. Sensitivity analyses were performed on the major input parameters that are expected to have significant impact on model results. The sensitivity analyses were performed for bed material grain size, inflowing sediment load and channel roughness, as discussed in the following.

A set of three graphs is used to illustrate the HEC-6T model results for each sensitivity run (Figures 66-74). It should be noted that the results at the far right end of the graphs should be disregarded as boundary effects. Those three graphs are described as follows:

Average Bed Elevation Change at Last Time Step – This graph shows the average change in bed elevation across the cross section at each river station at the end of the hydrologic simulation of floods. A positive number indicates bed aggradation and a negative number indicates bed degradation.

Sediment Passing Through Section – This graph illustrates the sediment load, in tons, that passes through each modeling section for the duration of the hydrologic simulation. Water flow and sediment transport is from larger river station to smaller river station (right to left on the graph). A rise in the line (from right to left) indicates an increasing sediment load passing the next downstream section, and that indicates "scour" from the intervening reach of watercourse. Conversely, a fall in the line indicates "fill" from the intervening reach of watercourse.

Transport Rate at Peak Discharge – This graph shows the transport rate of sand at the peak of the 100-year flood event. Water flow and sediment transport is from larger river station to smaller river station (right to left on the graph). A rise in the line (from right to left) indicates an increase in the transport rate from the intervening reach of watercourse. Conversely, a fall in the line indicates a decrease in transport rate from the intervening reach of watercourse.

BED MATERIAL GRAIN SIZE

Sensitivity to the input of bed material grain size was evaluated by running the HEC-6T model with finer bed material and coarser bed material. For each run, the grain size was altered while the size fraction (percent finer) was unchanged. For the finer bed material run, each sediment grain size within the size distribution was multiplied by 0.5. For the coarser grain size run, the base input grain size distribution was multiplied by two. The results of the sensitivity analyses of bed material size distribution are shown in Figures 66 through 68.

The run with the finer bed material generally results in greater magnitudes of sediment transport, and the run with coarser bed material generally results in lesser magnitudes of sediment transport, both as expected. However, in general, a change in bed material size

distribution does not change the overall performance of the models; although the magnitudes of scour (degradation) and fill (aggradation) change, the overall sedimentation process is not significantly affected by a change in bed material size. Figure 66 illustrates the effect of grain size on the magnitude of scour and fill on th bed of the river. Upstream of station 186 there is little bed elevation change as a result of either increasing or decreasing the bed material size. The maximum deviation in bed elevation change is downstream of station 183, where deviations from the results of the base model are plus or minus about two feet. Generally, changing the size distribution of the bed material results in little change in the bed elevation except at localized areas of scour or fill.

Figure 67 indicates that reducing the bed material grain size by half results in increased sediment transport rates of no more than about 10 percent. Increasing the grain size by two results in decreasing the transports rate by less than 15 percent. Considering the relatively large change in grain size, the change in transport rate is small.

Figure 68 shows that the peak rates of sediment transport (at 200,000 cfs) for either half or doubled grain size results in bed material transport rates that are about plus or minus 10 percent those for the base model. The sensitivity analyses of grain size indicate that the results of the base model would not deviate significantly with other reasonable estimates for bed material grain size.

INFLOWING SEDIMENT LOAD

For this sensitivity run the overall sediment inflow rating curves for the two rivers were not changed. The effect of bed material load fraction was evaluated by running the HEC-6T model with increased bed material load and reduced bed load. For increased bed material load, the percentages of coarse material in the inflowing sediment load size fractions were multiplied by two. For reduced bed material load, the percentages of coarse material in the inflowing sediment were cut in half as compared to the base model. The percentage of clay was adjusted to account for the increased or decreased percent of coarse material. The results of the sensitivity analyses of inflowing bed material load are shown in Figures 69 through 71.

Referring to Figure 69, the run with a greater percentage of bed material load inflow generally results in greater magnitudes of sediment fill (aggradation), whereas reducing the inflowing sediment load had very little impact on the bed elevations when compared to the results of the base model.

In Figure 70, the base model shows fairly uniform sediment transport of about 34 million tons through the river. The run with increased sediment inflow shows rapid release of that load as the water moves downstream to station 189, then the load remains fairly constant at about 41 million tons. The run with decreased sediment inflow shows a steady increase of sediment load from about 20 million tons to 30 million tons as the water moves downstream.

It is concluded that the use of increased bed material inflow to the model would result in long-term aggradation in the upper part of the El Rio study area and that use of decreased

bed material inflow to the model would result in long term degradation throughout the river. There is no empirical evidence to support either long term aggradation or degradation of the channel of the Gila River in this area.

CHANNEL ROUGHNESS

Sensitivity to channel roughness was evaluated by setting the Manning's n-value for the overbank and channel to a maximum and a minimum reasonable value. The base model channel roughness in the overbank was set by taking a conveyance weighted average of the Baker HEC-RAS overbank values, and ranges from 0.15 to 0.025. The base model channel n-value was set at 0.03. For the "rough" sensitivity model run the overbanks were set to 0.15 with a channel value of 0.04, while the "smooth" sensitivity model run had the overbanks set to 0.03 and the channel at 0.02. The results of the sensitivity analysis of channel roughness are shown in Figures 72 through 74.

As expected, the run with larger n-values and therefore a rougher simulated channel produced about 10 percent less sediment load than the base model, while the smoother channel resulted in about 10 percent more sediment load (Figure 73). Towards the downstream end of the reach (RS 178.61), the smaller n-value run converges with the base model run. Upon inspection it was determined that this is because the base model n-values through that reach closely resemble those of the "smooth" run.

Figure 74 (Transport rate at 100-Year Peak) shows that reducing the roughness will result in increased transport rates and increasing the roughness will result in decreased transport rates. However, although the changes of model roughness are often quite large, the sediment transport rates generally only fluctuate by plus or minus 10 percent with a maximum deviation of about 25 percent. It is noted in Figure 74 that there are locations where either the "rough" model results line or the "smooth" model results line cross the base model line. These locations indicate areas where the conveyance weighted n-values in the base model are actually either greater or less than the n-values in the "rough" or "smooth" models.

CONCLUSION OF SENSITIVITY ANALYSES

The sensitivity analyses indicates that modeling uncertainties that tend to increase erosion (finer bed material grain size, decreased inflowing bed load and a smoother channel) and those that tend to decrease erosion (coarser bed material grain size, increased inflowing bed load and a rougher channel) do not dramatically alter the HEC-6T results over the base HEC-6T input conditions. Alterations of those model uncertainties result in changes in the magnitudes of the model responses but not the general trends. These parameters are not sensitive enough to affect the results and conclusions of this study when using reasonable values.

Figure 66
Bed Material Grain Size Sensitivity Analysis
Average Bed Elevation Change at Last Time Step

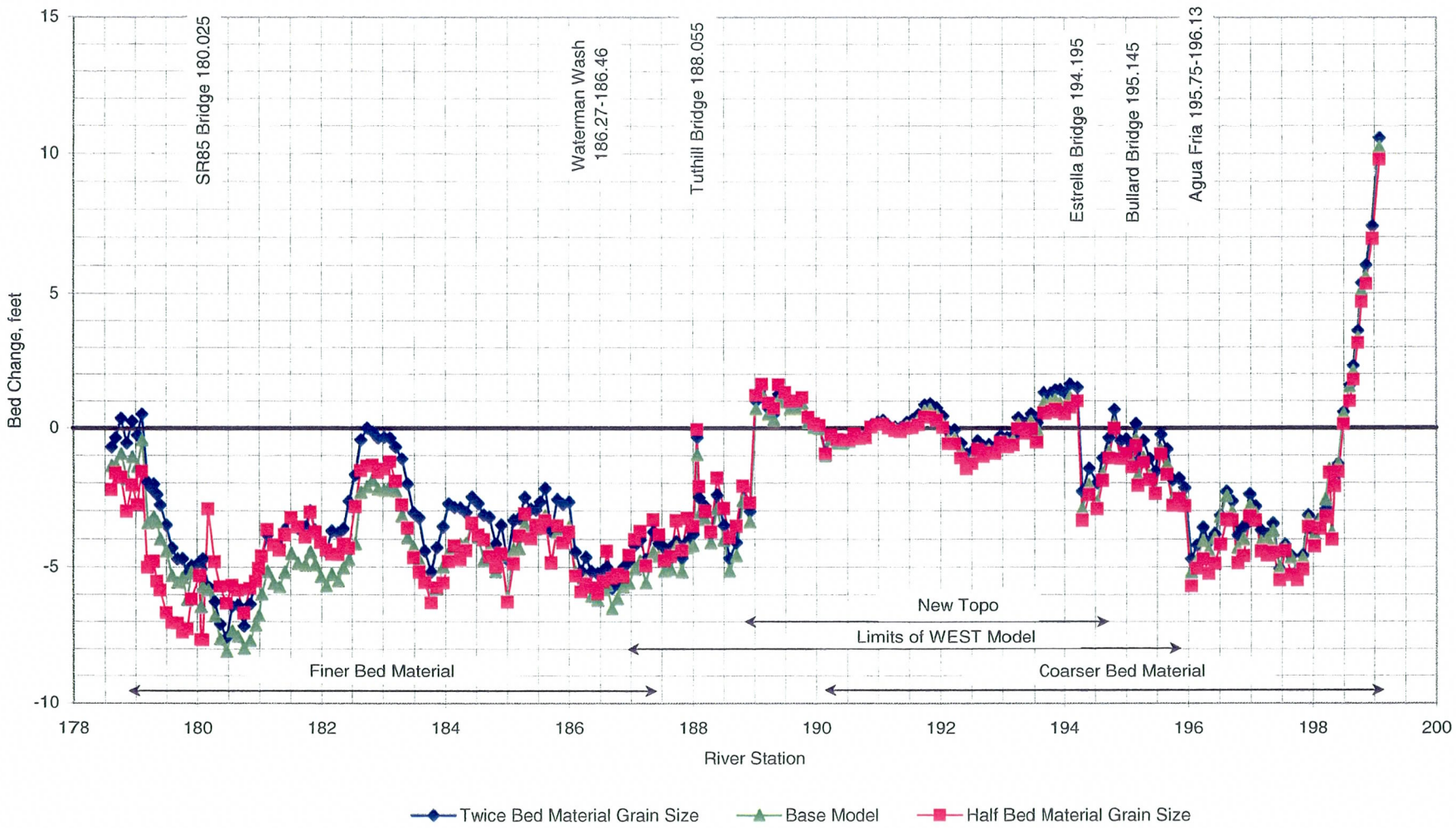


Figure 67
Bed Material Grain Size Sensitivity Analysis
Sand Passing Through Section

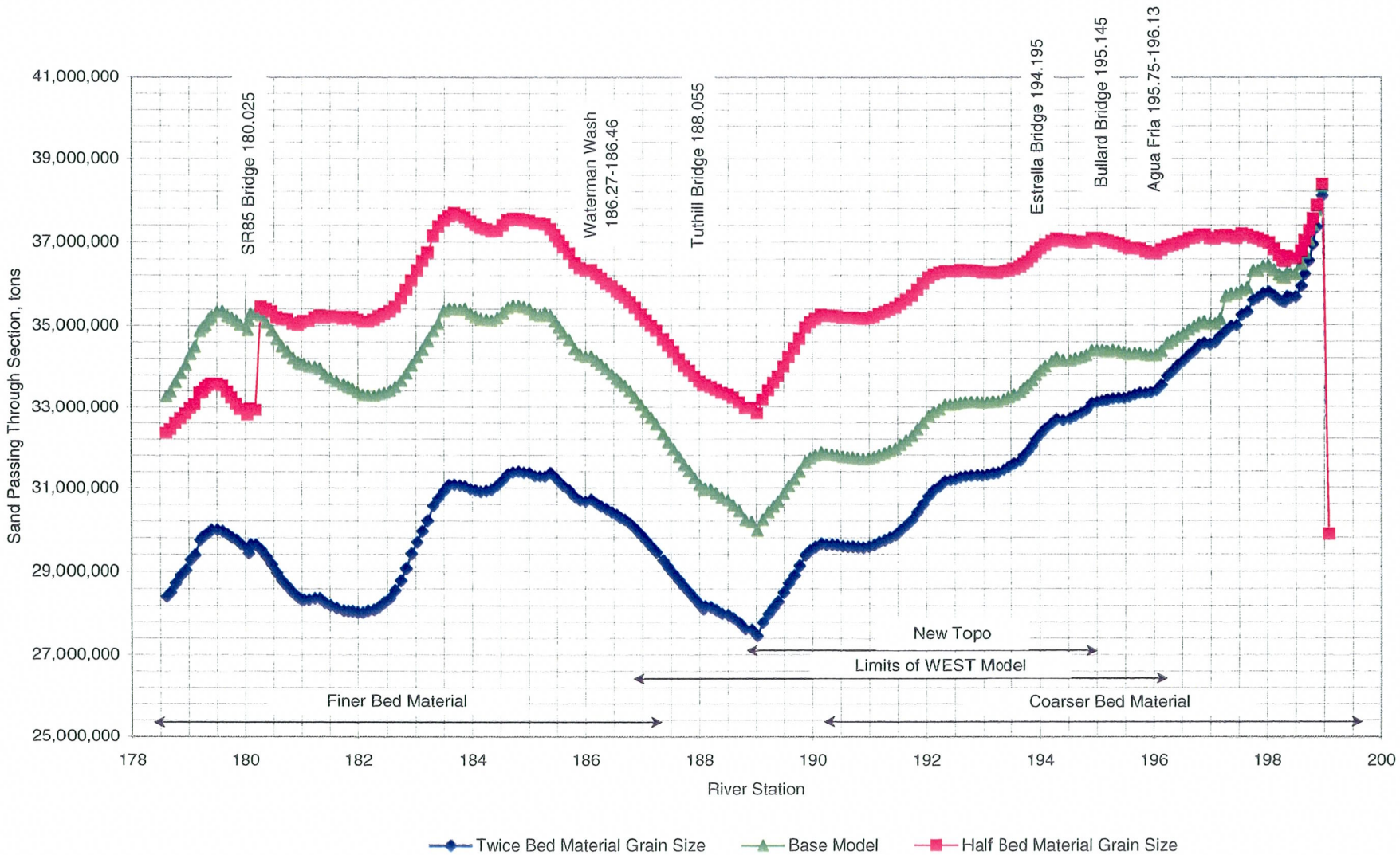


Figure 68
Bed Material Grain Size Sensitivity Analysis
Tranport Rate at 100-Year Peak (200,000 cfs)

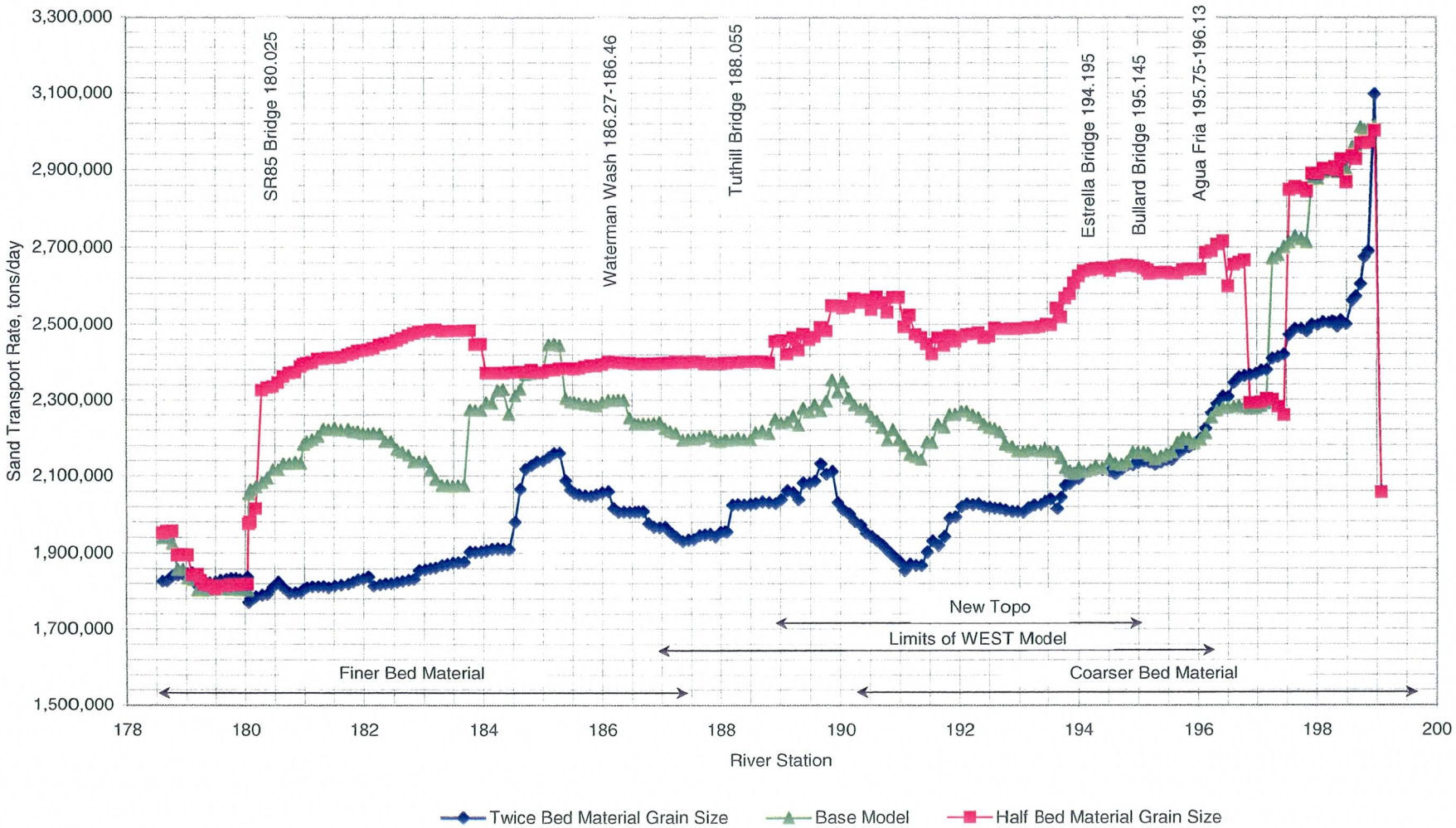


Figure 69
Inflowing Sediment Sensitivity Analysis
Average Bed Elevation Change at Last Time Step

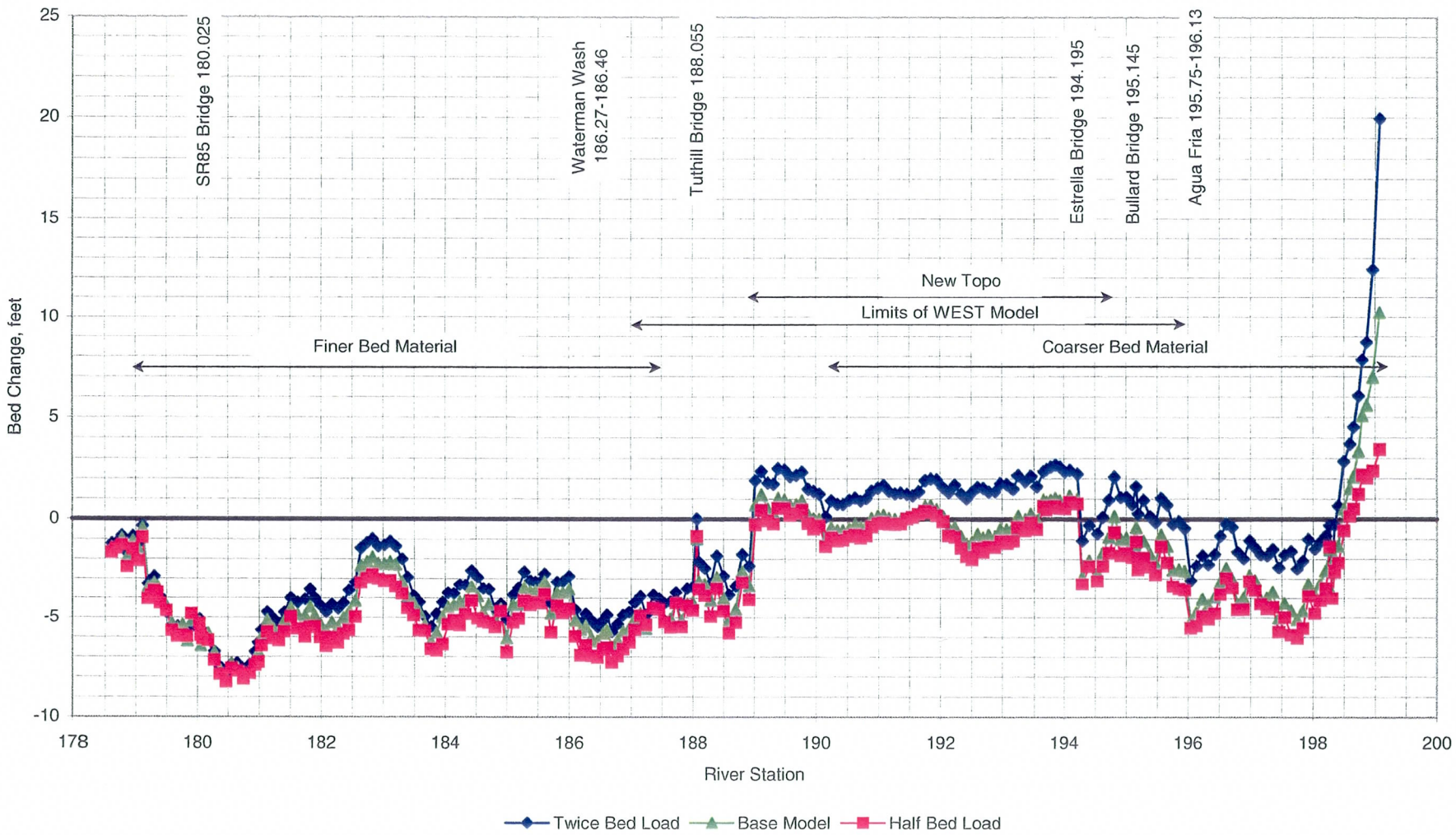


Figure 70
Inflowing Sediment Sensitivity Analysis
Sediment Passing Through Section

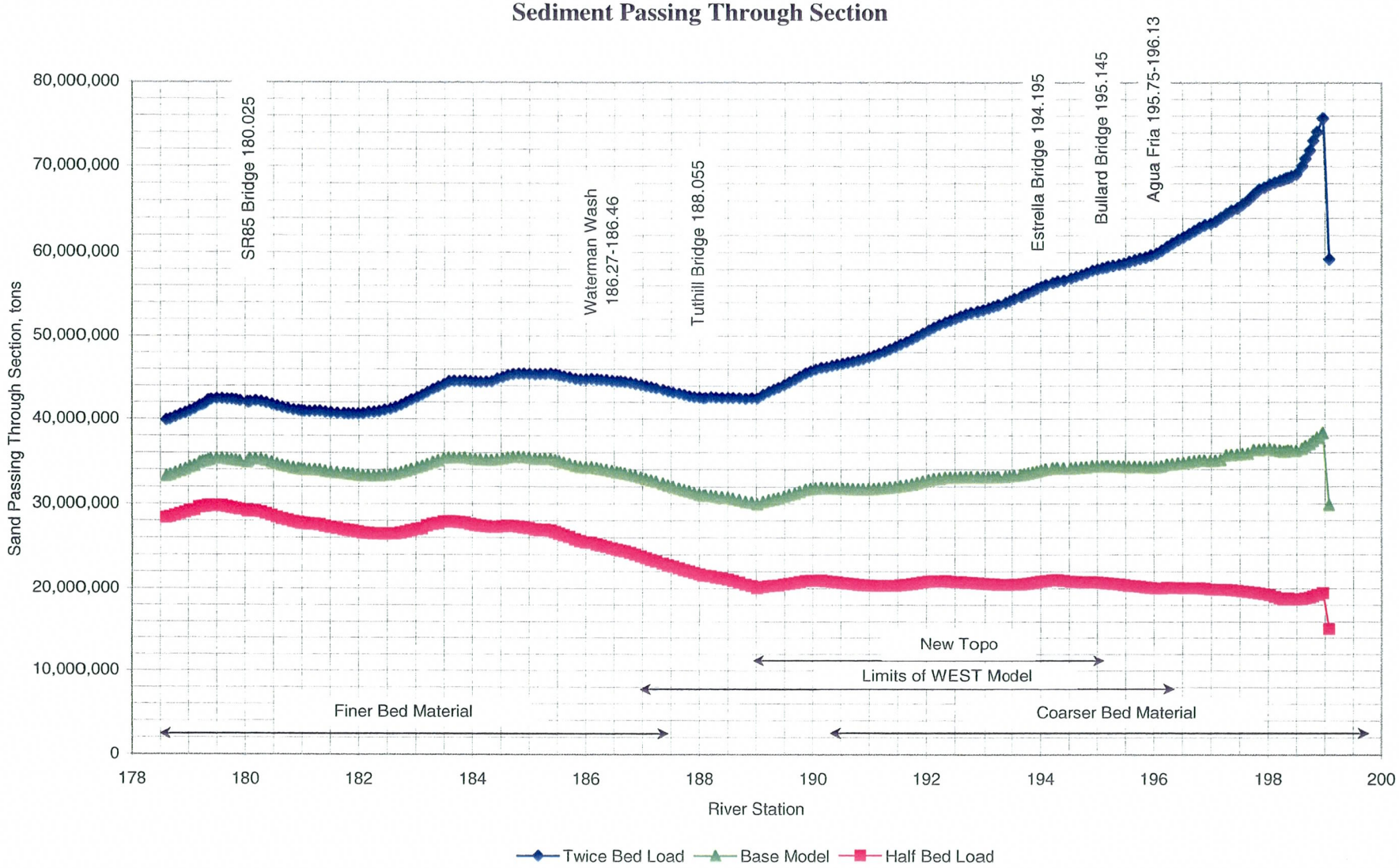


Figure 71
Inflowing Sediment Sensitivity Analysis
Tranport Rate at 100-Year Peak (200,000 cfs)

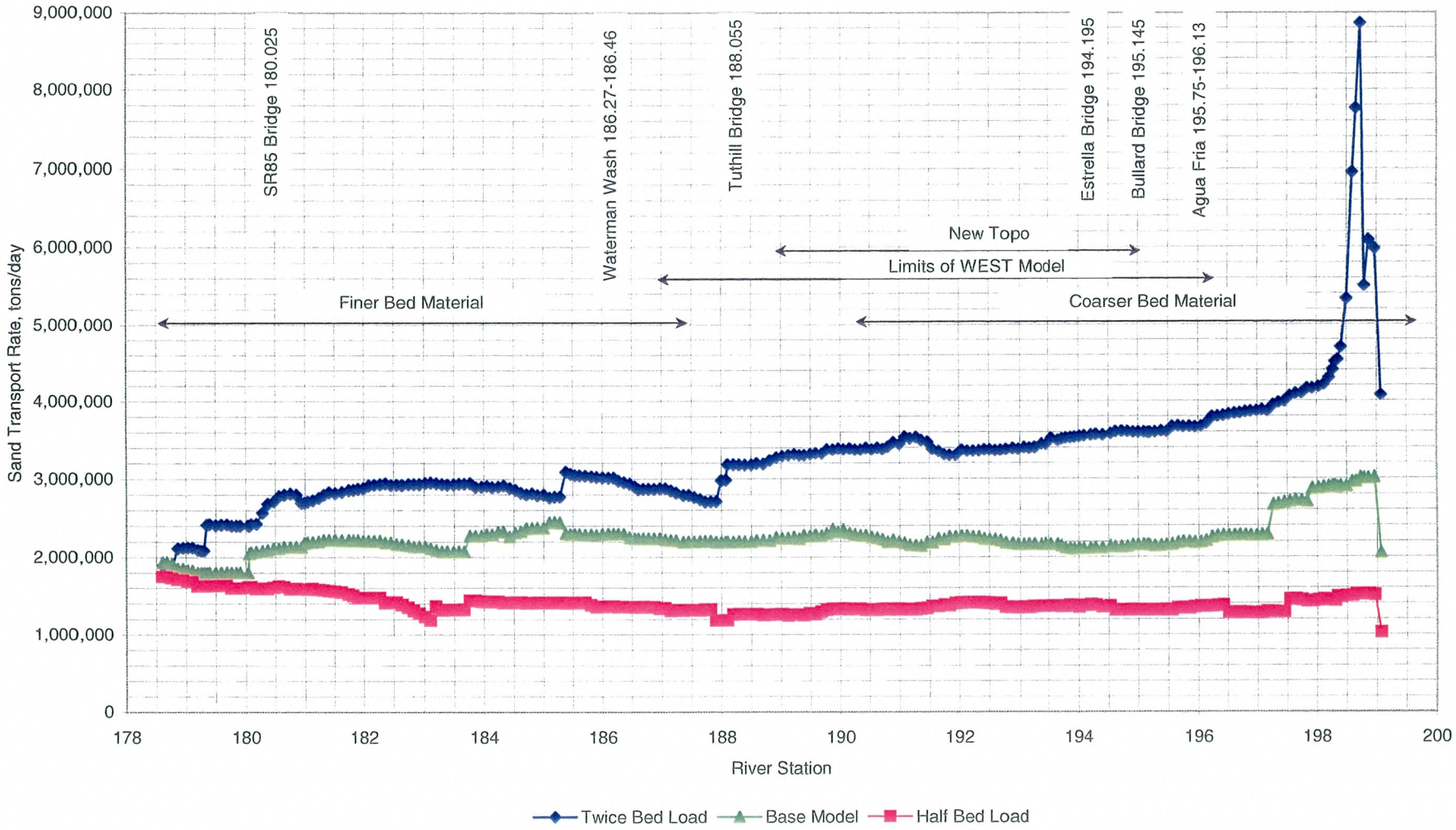


Figure 72
Channel Roughness Sensitivity Analysis
Average Bed Elevation Change at Last Time Step

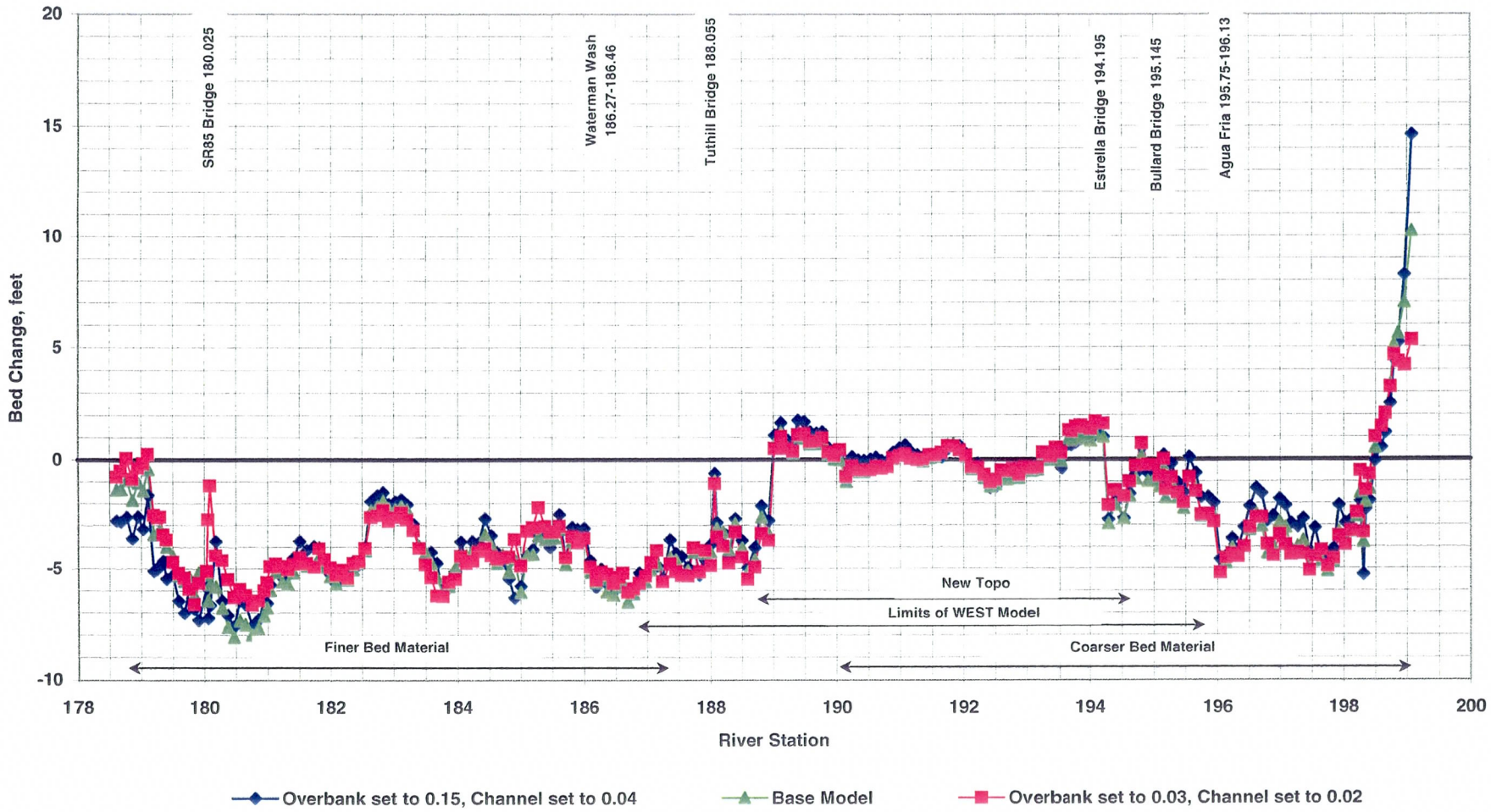


Figure 73
Channel Roughness Sensitivity Analysis
Sediment Passing Through Section

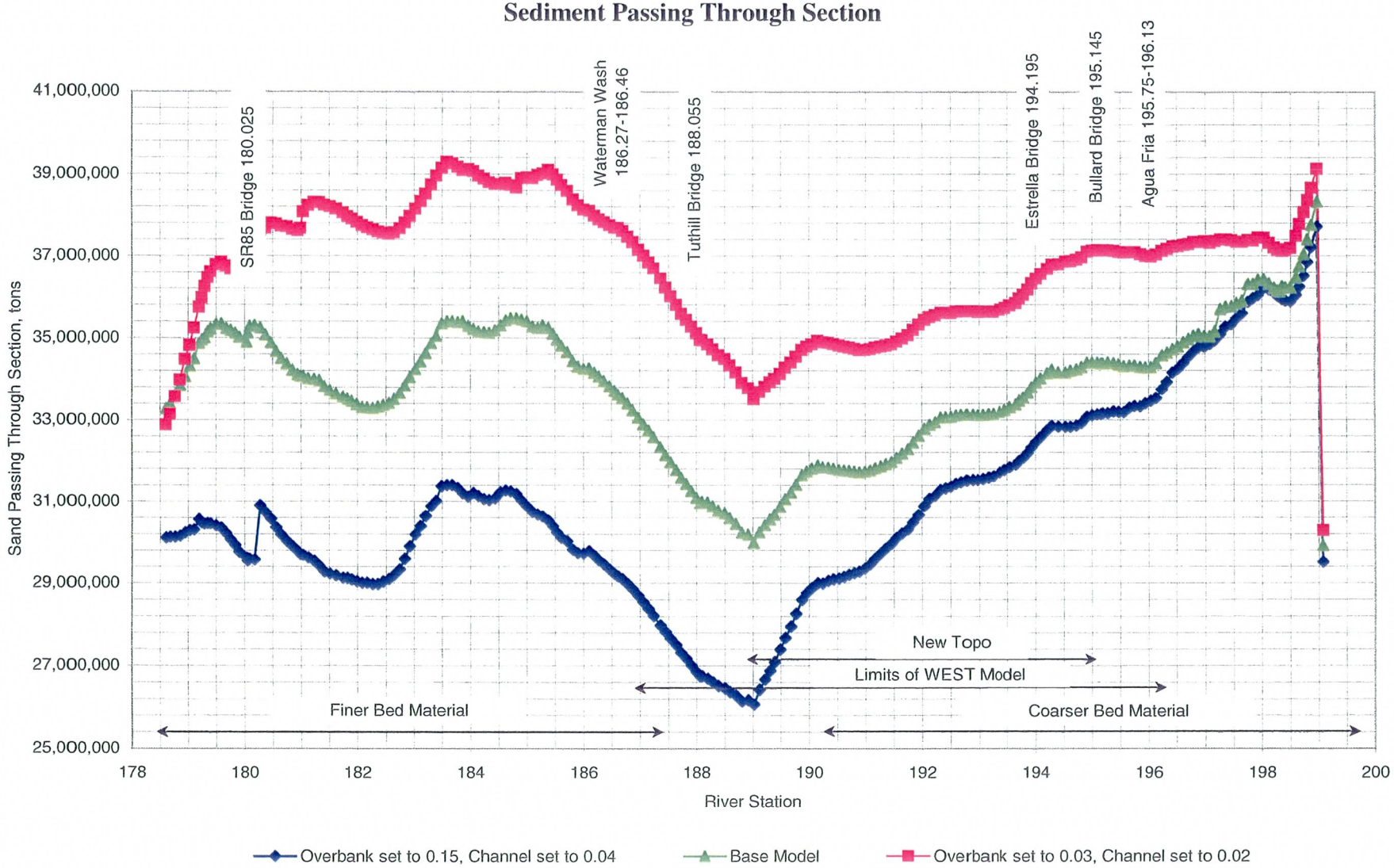
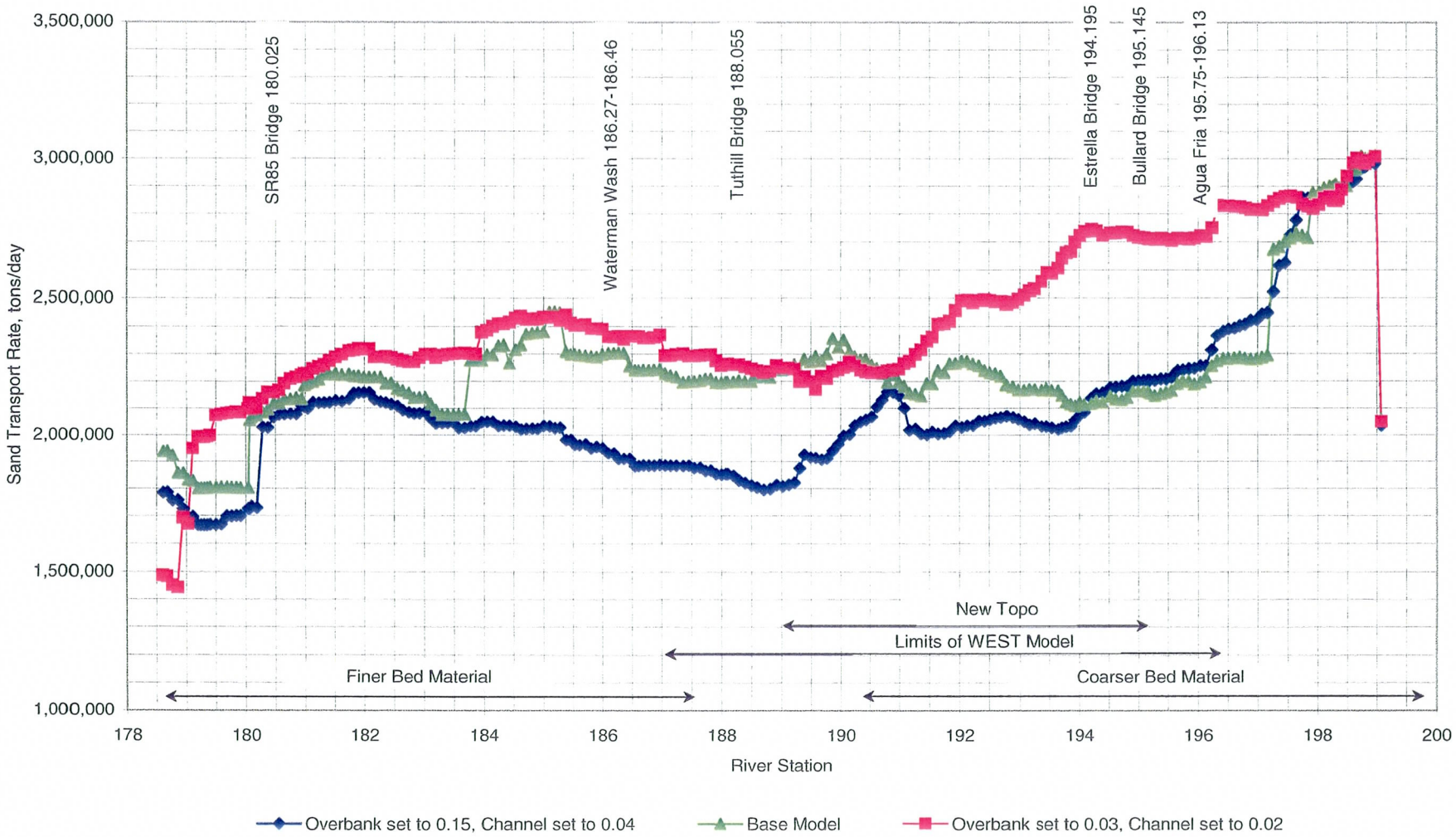


Figure 74
Channel Roughness Sensitivity Analysis
Tranport Rate at 100-Year Peak (200,000 cfs)



CONCLUSIONS OF THE SEDIMENTATION ANALYSIS OF THE EL RIO STUDY REACH

1. The existing Gila River in the El Rio study area has the following characteristics:

    a) At low flows, generally less than about 35,000 cfs, the river is braided. Flow occurs in numerous small channels that intersect through a broad expanse of the river.

    b) At high flows, the river tends to be straight. During floods, the flow is concentrated in a relatively narrow main channel.

    c) The bed of the river is predominantly sand.

    d) The bed material is slightly coarser in the upper 8 miles, which is due to the inflow of gravel and cobble from the Salt River.

2. Floods in the El Rio study area are predominantly from the Salt River with a lesser contribution from the Gila River upstream of the confluence.

3. Sediment inflow to the El Rio study area has the following characteristics:

    a) The Salt River supplies a lower concentration of wash load due to the numerous storage dams on the Salt and Verde Rivers.

    b) The Salt River supplies a larger portion of coarse bed material (gravel and cobble) than the Gila River upstream of the confluence.

    c) The Gila River provides higher concentrations of wash load due to the lack of storage dams in the near vicinity on either the Gila River or the Santa Cruz River.

    d) The Gila River provides a greater concentration of sand load than the Salt River. The Gila River upstream of the confluence is a broad sand bed river. The Salt River upstream of the confluence is armored with gravel and cobble.

4. During floods, the majority of the sediment transport is in a relatively narrow channel through the broad floodplain.

5. The main channel of the Gila River is in near dynamic equilibrium; sediment inflow equals sediment outflow.

6. The HEC-6T model cannot accurately estimate the deposition of fine sand and silt in the highly vegetated overbank areas.

7. Erosion and deposition varies along the length of the river.

a) Deposition is expected in the broad channel from station 189 to station 194.

b) Overall erosion is expected in the river channel from station 185 to station 189 and for about 2 miles upstream of the SR 85 bridge.

c) General scour of as much as 8 feet can be expected in the channel of the river during floods.

8. The volume of sediment passing through the El Rio study area during a 100-year sequence of floods is about 350 million tons or about 200,000 acre-feet. That volume agrees well with the Corps of Engineers estimate of sedimentation in Painted Rock Reservoir for the period from 1953 through 1993.

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Attachment 1:

Field Sediment Analysis Results

ameo

PROJECT:	EL RIO WATER COURSE MASTER PLAN	**JOB NO:**	2-119-000193
LOCATION:	MARICOPA COUNTY, ARIZONA	**WORK ORDER NO:**	1
SAMPLE SOURCE:	SEE BELOW	**DATE SAMPLED:**	9/6/02

MECHANICAL SIEVE ANALYSIS
GROUP SYMBOL, USCS (ASTM D-2487)

SIEVE SIZES

				Silt or Clay	SAND								GRAVEL								COBBLES		
					Fine			Medium			Coarse		#3 Fine				Coarse						
Location & Depth	**USCS**	**LL**	**PI**	**#200**	**#100**	**#50**	**#40**	**#30**	**#16**	**#10**	**#8**	**#4**	**1/4"**	**3/8"**	**1/2"**	**3/4"**	**1"**	**1 1/4"**	**1 1/2"**	**2"**	**3"**	**6"**	**Lab #**
			mm	.074	.149	.297	.420	.590	1.19	2.00	2.38	4.76	6.35	9.52	12.7	19.1	25.4			50.8			

PERCENT PASSING BY WEIGHT

NEAR SR 85 BRIDGE				3.6	4	5	18	46	89	96	97	98	99	99	99	100	100	100	100	100	100	100	100	1
SOIL SAMPLE #2, NEAR SR 85 BRIDGE				0.4	1	14	42	74	95	98	99	100	100	100	100	100	100	100	100	100	100	100	100	2
SOIL SAMPLE #3, BULLARD AVE. BRIDGE				1.3	12	63	90	97	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	3
SOIL SAMPLE #4, BULLARD AVE. BRIDGE				0.3	1	8	19	40	66	72	73	76	77	79	81	85	89	94	98	100	100	100	100	4

amec

PROJECT:	EL RIO WATERCOURSE MASTER PLAN	**JOB NO:**	2-119-000193
LOCATION:	PHOENIX, AZ	**WORK ORDER NO:**	2
MATERIAL:	SOIL	**LAB NO:**	5
SAMPLE SOURCE:	US WATERMAN WASH #5	**DATE SAMPLED:**	10/10/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	100
1 1/2in.	95
1 1/4in.	91
1in.	84
3/4in.	78
1/2in.	71
3/8in.	67
1/4in.	62
#4	60
#8	55
#10	54
#16	48
#30	26
#40	13
#50	6
#100	2
#200	1.0

amec

PROJECT:	EL RIO WATERCOURSE MASTER PLAN	**JOB NO:**	2-119-000193
LOCATION:	PHOENIX, AZ	**WORK ORDER NO:**	2
MATERIAL:	SOIL	**LAB NO:**	6
SAMPLE SOURCE:	WPT 3 #6	**DATE SAMPLED:**	10/10/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	100
1 1/2in.	100
1 1/4in.	100
1in.	100
3/4in.	100
1/2in.	100
3/8in.	100
1/4in.	100
#4	100
#8	100
#10	100
#16	100
#30	100
#40	100
#50	99
#100	90
#200	61

amec

PROJECT:	EL RIO WATERCOURSE MASTER PLAN	**JOB NO:**	2-119-000193
LOCATION:	PHOENIX, AZ	**WORK ORDER NO:**	2
MATERIAL:	SOIL	**LAB NO:**	7
SAMPLE SOURCE:	WPT 4-5 #7	**DATE SAMPLED:**	10/10/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	100
1 1/2in.	100
1 1/4in.	100
1in.	100
3/4in.	100
1/2in.	100
3/8in.	100
1/4in.	100
#4	100
#8	100
#10	100
#16	99
#30	91
#40	69
#50	29
#100	3
#200	0.5

amec

PROJECT:	EL RIO WATERCOURSE MASTER PLAN	**JOB NO:**	2-119-000193
LOCATION:	PHOENIX, AZ	**WORK ORDER NO:**	2
MATERIAL:	SOIL	**LAB NO:**	8
SAMPLE SOURCE:	WATERMAN WASH WPT 6 #8	**DATE SAMPLED:**	10/10/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	100
1 1/2in.	100
1 1/4in.	100
1in.	100
3/4in.	100
1/2in.	100
3/8in.	99
1/4in.	96
#4	94
#8	83
#10	78
#16	57
#30	28
#40	14
#50	6
#100	1
#200	0.8

amec

PROJECT:	EL RIO WATER COURSE MASTER PLAN	JOB NO:	2-119-000193
LOCATION:	82000240-PHOENIX, AZ	WORK ORDER NO:	3
MATERIAL:	NATIVE SOIL	LAB NO:	9
SAMPLE SOURCE:	WAYPOINT 9 @ 1.0'	DATE SAMPLED:	10/29/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	93
1 1/2in.	78
1 1/4in.	71
1in.	67
3/4in.	61
1/2in.	54
3/8in.	51
1/4in.	47
#4	46
#8	43
#10	42
#16	36
#30	14
#40	7
#50	3
#100	2
#200	1.1

amec

PROJECT:	EL RIO WATER COURSE MASTER PLAN	JOB NO:	2-119-000193
LOCATION:	82000240-PHOENIX, AZ	WORK ORDER NO:	3
MATERIAL:	NATIVE SOIL	LAB NO:	10
SAMPLE SOURCE:	WAYPOINT 9 @ 1.5'	DATE SAMPLED:	10/29/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	100
1 1/2in.	85
1 1/4in.	82
1in.	75
3/4in.	70
1/2in.	63
3/8in.	60
1/4in.	55
#4	53
#8	48
#10	47
#16	38
#30	12
#40	5
#50	2
#100	1
#200	0.5

amec

PROJECT:	EL RIO WATER COURSE MASTER PLAN	JOB NO:	2-119-000193
LOCATION:	82000240-PHOENIX, AZ	WORK ORDER NO:	3
MATERIAL:	NATIVE SOIL	LAB NO:	11
SAMPLE SOURCE:	WAYPOINT 10	DATE SAMPLED:	10/29/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	96
1 1/2in.	92
1 1/4in.	89
1in.	85
3/4in.	79
1/2in.	71
3/8in.	67
1/4in.	62
#4	60
#8	56
#10	55
#16	48
#30	27
#40	12
#50	4
#100	1
#200	1.2

amec

PROJECT:	EL RIO WATER COURSE MASTER PLAN	JOB NO:	2-119-000193
LOCATION:	82000240-PHOENIX, AZ	WORK ORDER NO:	3
MATERIAL:	NATIVE SOIL	LAB NO:	12
SAMPLE SOURCE:	WAYPOINT 11	DATE SAMPLED:	10/29/02

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)

MECHANICAL ANALYSIS

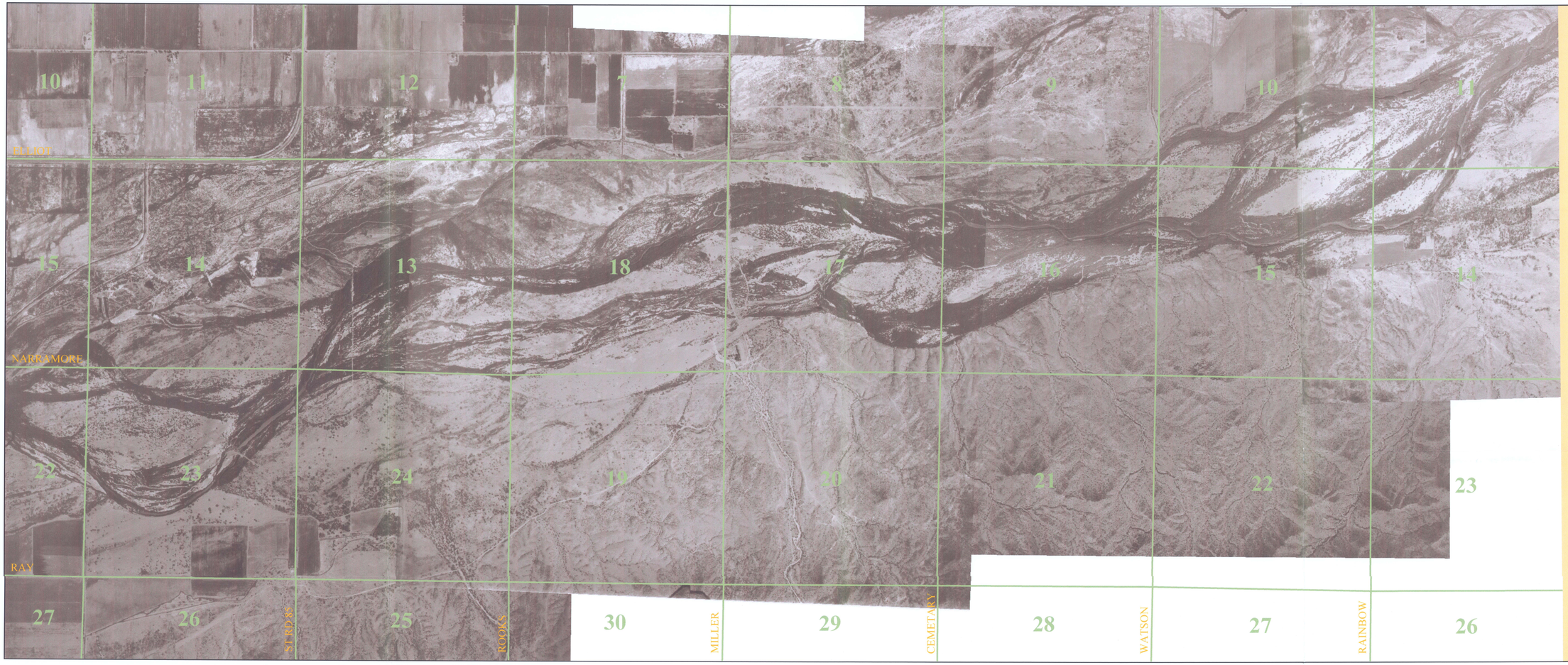
SIEVE SIZE	% PASSING
6in.	100
4in.	100
3in.	100
2in.	100
1 1/2in.	100
1 1/4in.	100
1in.	100
3/4in.	100
1/2in.	100
3/8in.	100
1/4in.	100
#4	100
#8	100
#10	99
#16	98
#30	84
#40	66
#50	47
#100	16
#200	4.2

Pebble Count near Jackrabbit Rd

	Size, in feet		
Distance	Shortest Axis	Intermediate Axis	Longest Axis
(1)	(2)	(3)	(4)
10	0.03	0.13	0.18
20	0.08	0.18	0.25
30	0.05	0.05	0.07
40	0.1	0.11	0.19
50	0.13	0.22	0.33
60	0.1	0.28	0.56
70	0.03	0.11	0.13
80	0.03	0.04	0.08
90	0.08	0.1	0.19
100	0.02	0.05	0.07
110	0.04	0.08	0.1
120	0.05	0.08	0.1
130	0.34	0.46	0.54
140	0.18	0.4	0.47
150	0.15	0.29	0.47
160	0.1	0.16	0.19
170	0.11	0.15	0.23
180	0.07	0.25	0.27
190	0.35	0.49	0.95
200	0.04	0.09	0.13
210	0.05	0.11	0.16
220	0.03	0.06	0.09
230	0.1	0.27	0.3
240	0.02	0.04	0.06
250	0.02	0.05	0.06
260	0.03	0.1	0.16
270	0.11	0.12	0.17
280	0.02	0.03	0.04
290	0.07	0.1	0.16
300	0.14	0.14	0.28

Attachment 2:

Historic Aerial Photography



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:

Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

N
W E
S

0 500 1,000 2,000
Feet

Notes:

Aerial Photographs were taken during February and March 1949.

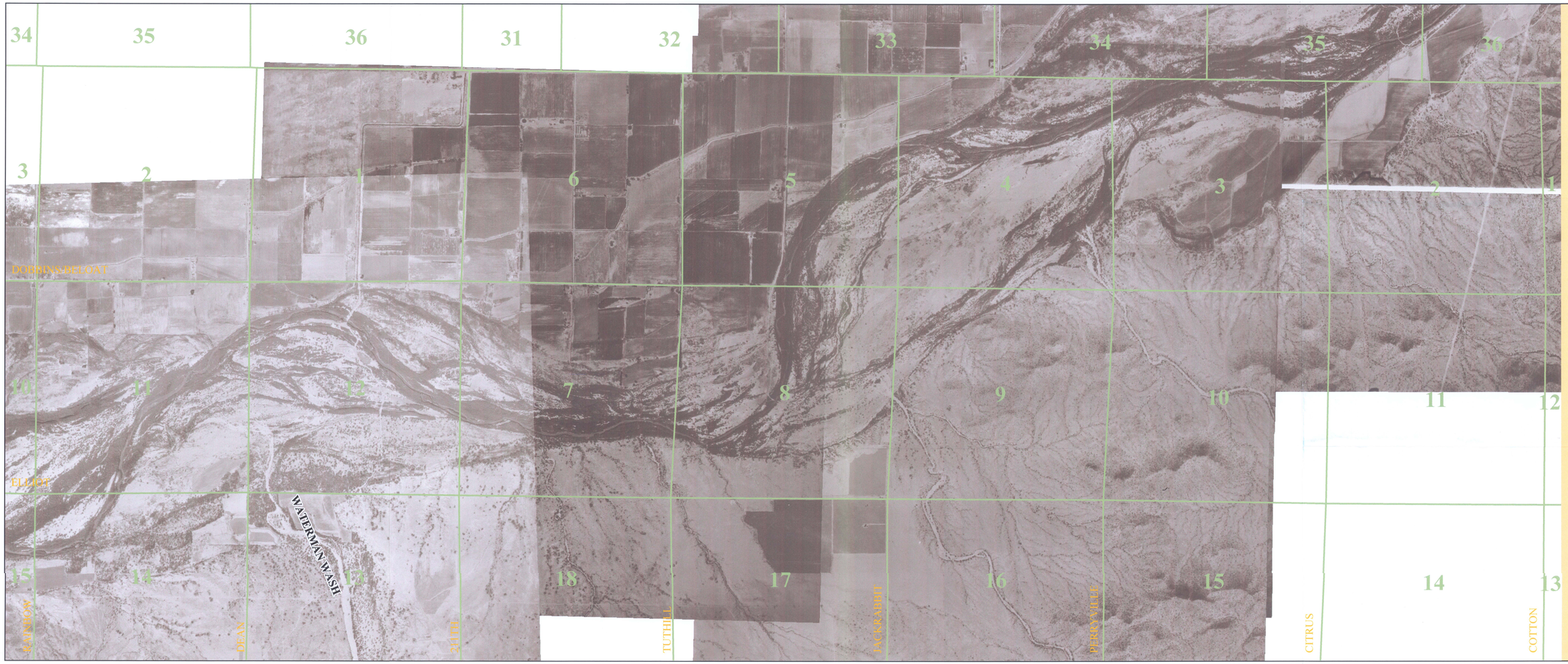
Client/Project:

Title:

FIGURE A2-1
1949 AERIAL PHOTOGRAPHS
SR 85 TO RAINBOW

Produced by: BGS

Date: 08/24/2005



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:

Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

N
W E
S

0 500 1,000 2,000
Feet

Notes:

Aerial photographs were taken during February and March 1949.

Client/Project:

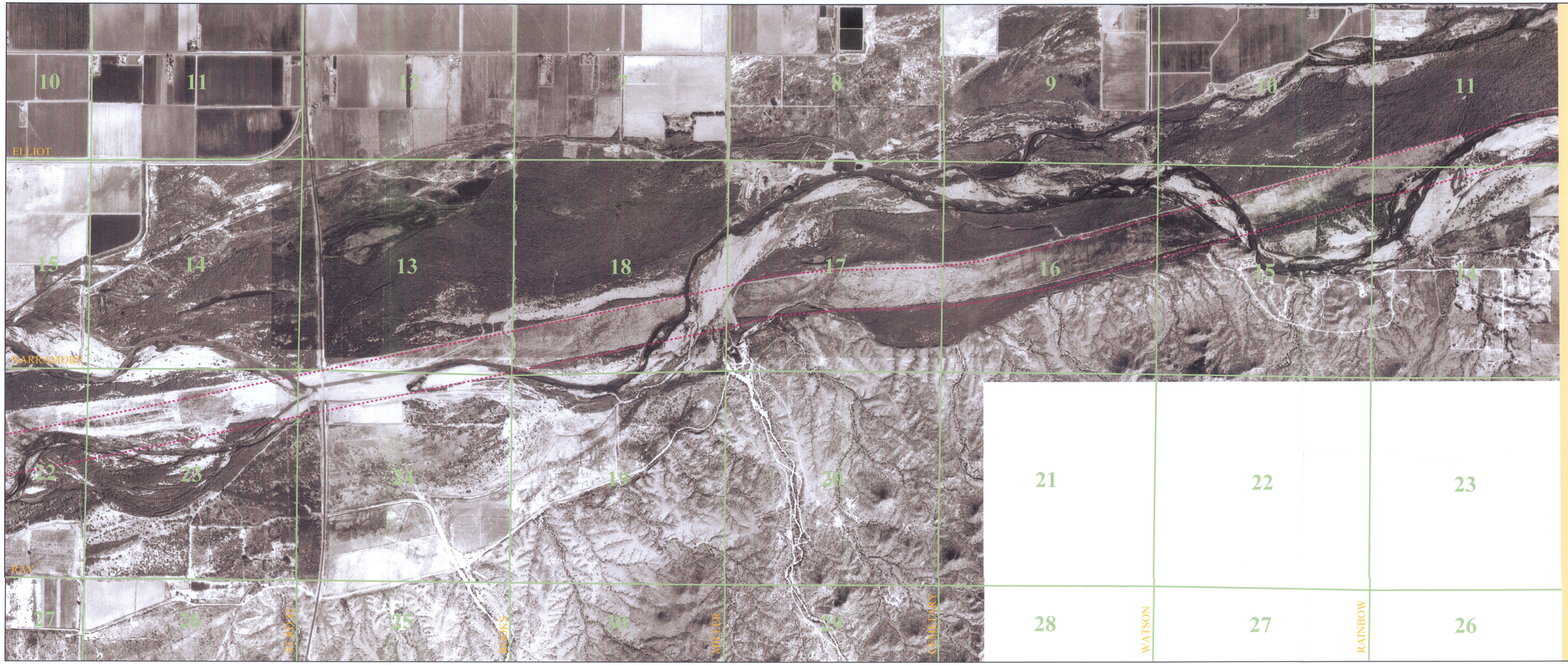
EL RIO

Title:

FIGURE A2-2
1949 AERIAL PHOTOGRAPHS
RAINBOW TO COTTON

Produced by: BGS

Date: 08/24/2005



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:
LIMITS OF CLEARING

N
W E
S

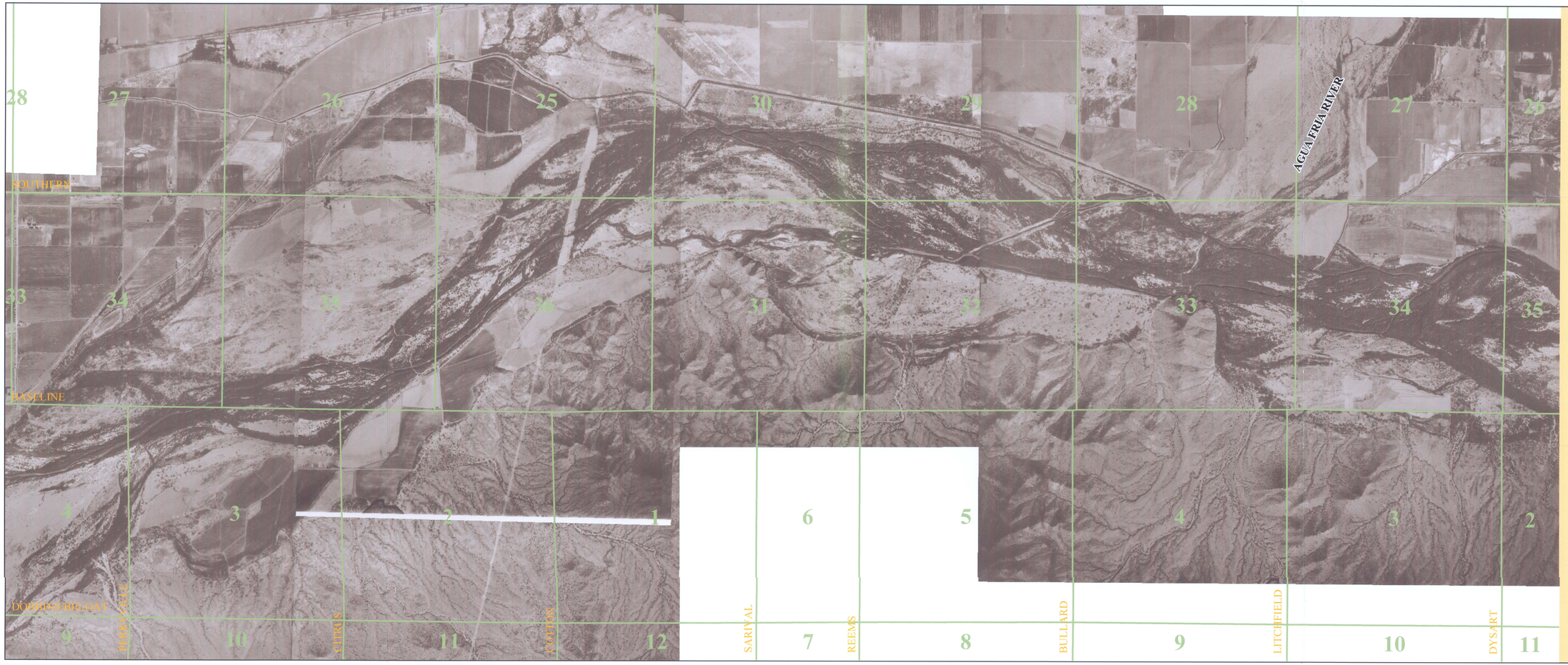
0 500 1,000 2,000
Feet

Notes:
Aerial photographs were taken during winter 1992.

Client/Project:
El Rio

Title:
FIGURE A2-7
1992 AERIAL PHOTOGRAPHS
SR 85 TO RAINBOW

Produced by: BGS
Date: 08/24/2005



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

N
W E
S

0 500 1,000 2,000
Feet

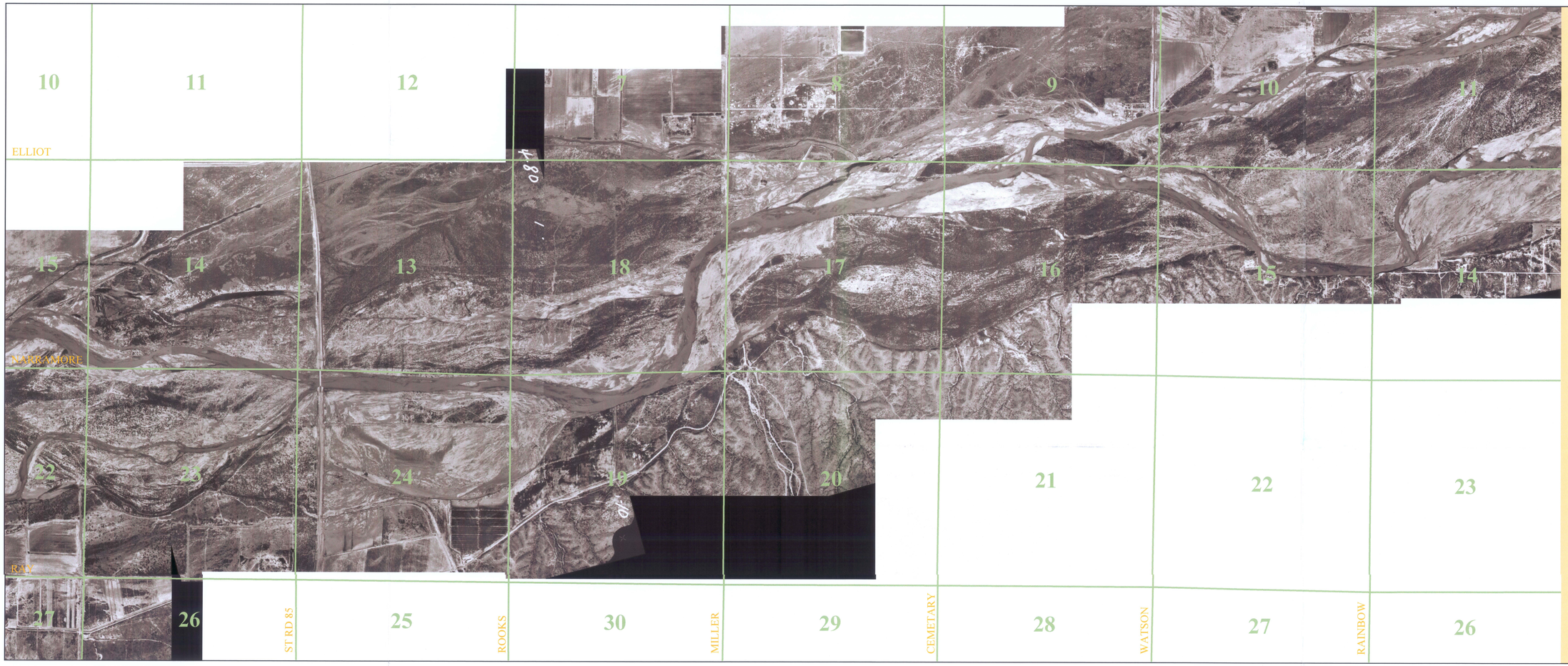
Notes:
Aerial Photographs were taken during February and March 1949.

Client/Project:
El RIO

Title:
FIGURE A2-3
1949 AERIAL PHOTOGRAPHS
PERRYVILLE TO DYSART

Produced by: BGS

Date: 08/24/2003



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

N
W E
S

0 500 1,000 2,000
Feet

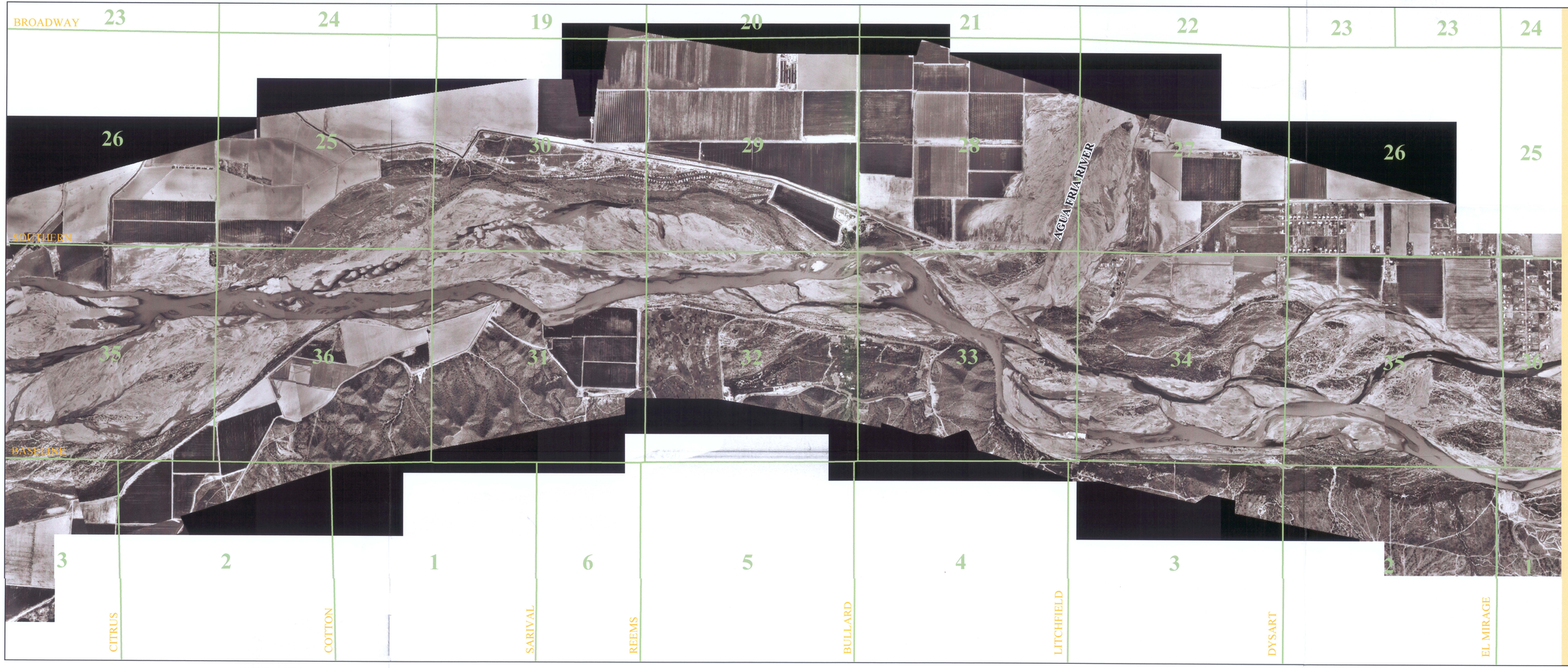
Notes:
Aerial Photographs were taken during March 1980.

Client/Project:
El Rio

Title:
FIGURE A2-4
1980 AERIAL PHOTOGRAPHS
SR 85 TO RAINBOW

Produced by: BGS

Date: 08/24/2005



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

N
W E
S

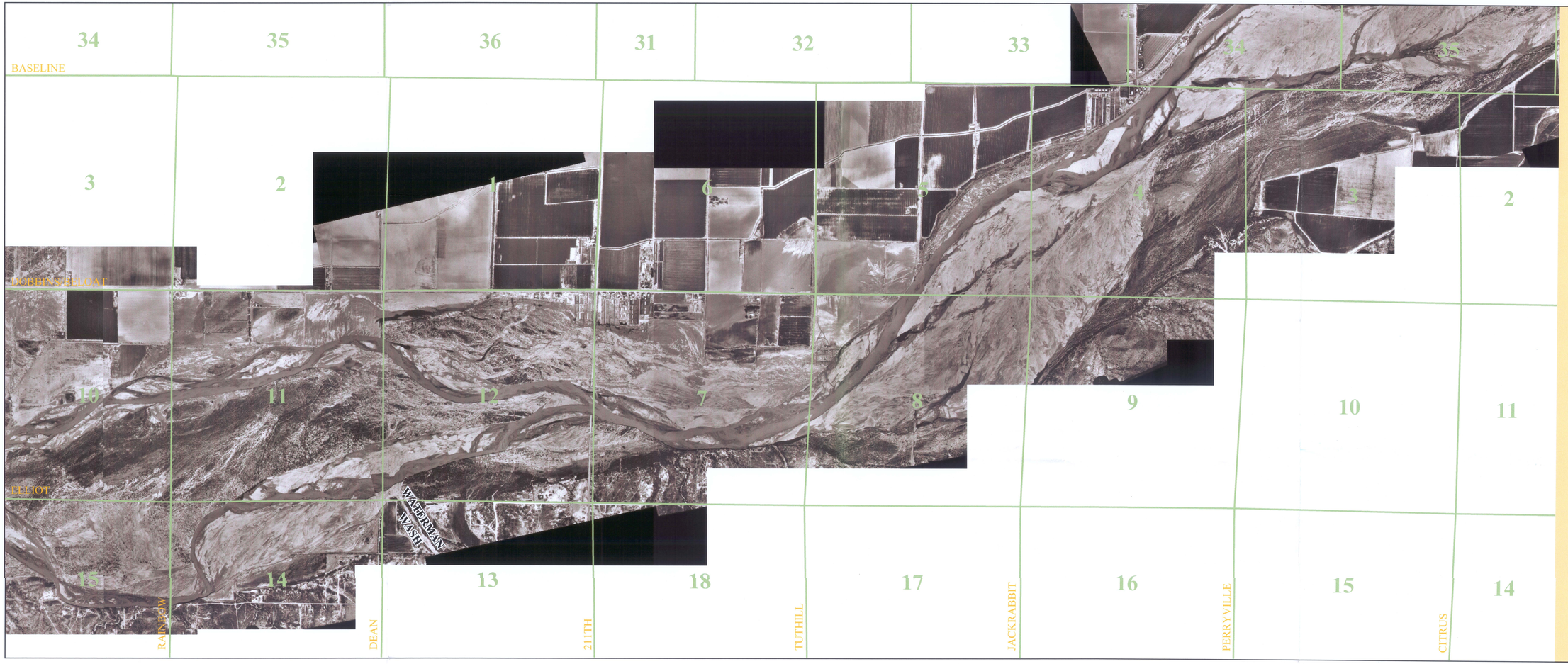
0 500 1,000 2,000
Feet

Notes:
Aerial photographs were taken during March 1980.

Client/Project:
El Rio

Title:
FIGURE A2-6
1980 AERIAL PHOTOGRAPHS
CITRUS TO EL MIRAGE

Produced by: BGS
Date: 08/24/2005



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:

N
W E
S

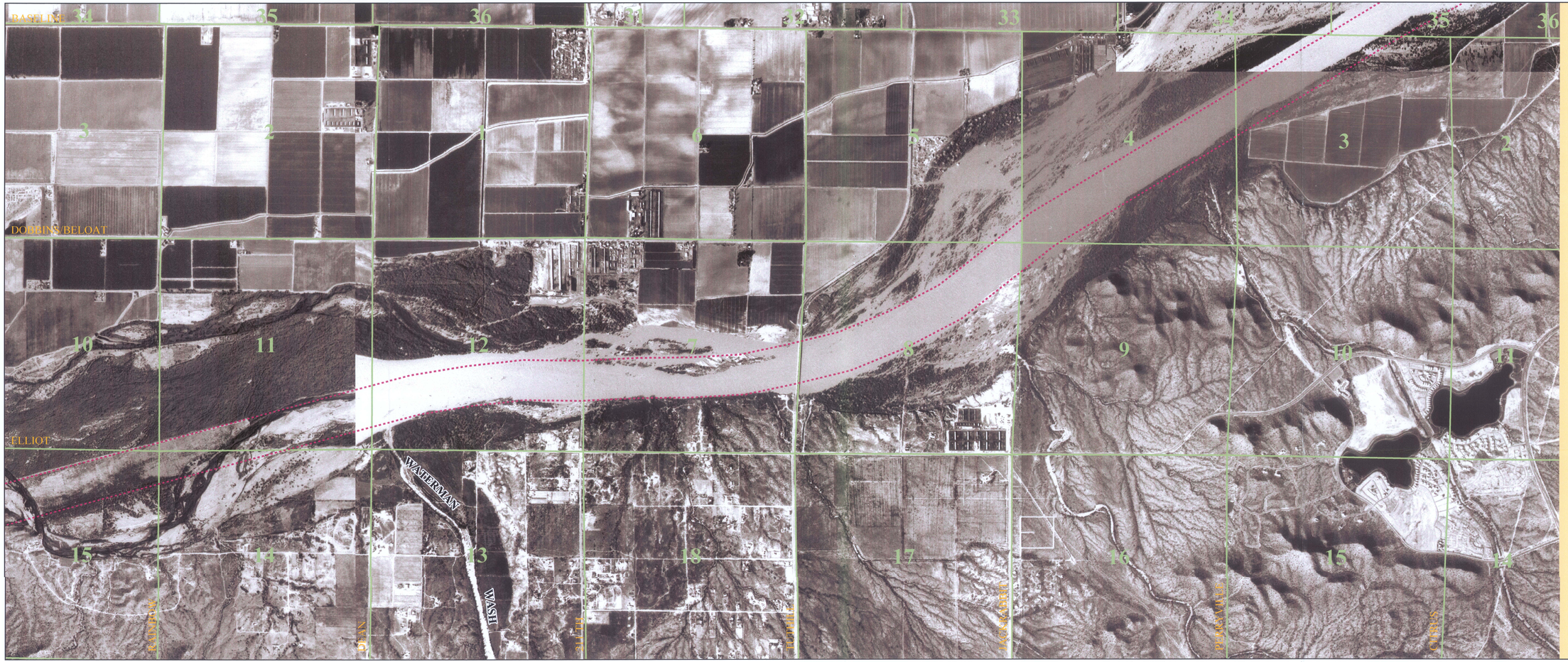
0 500 1,000 2,000
Feet

Notes:
Aerial Photographs were taken during March 1980.

Client/Project:
El Rio

Title:
FIGURE A2-5
1980 AERIAL PHOTOGRAPHS
RAINBOW TO CITRUS

Produced by: BGS
Date: 08/24/2005



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:
LIMITS OF CLEARING

N
W E
S

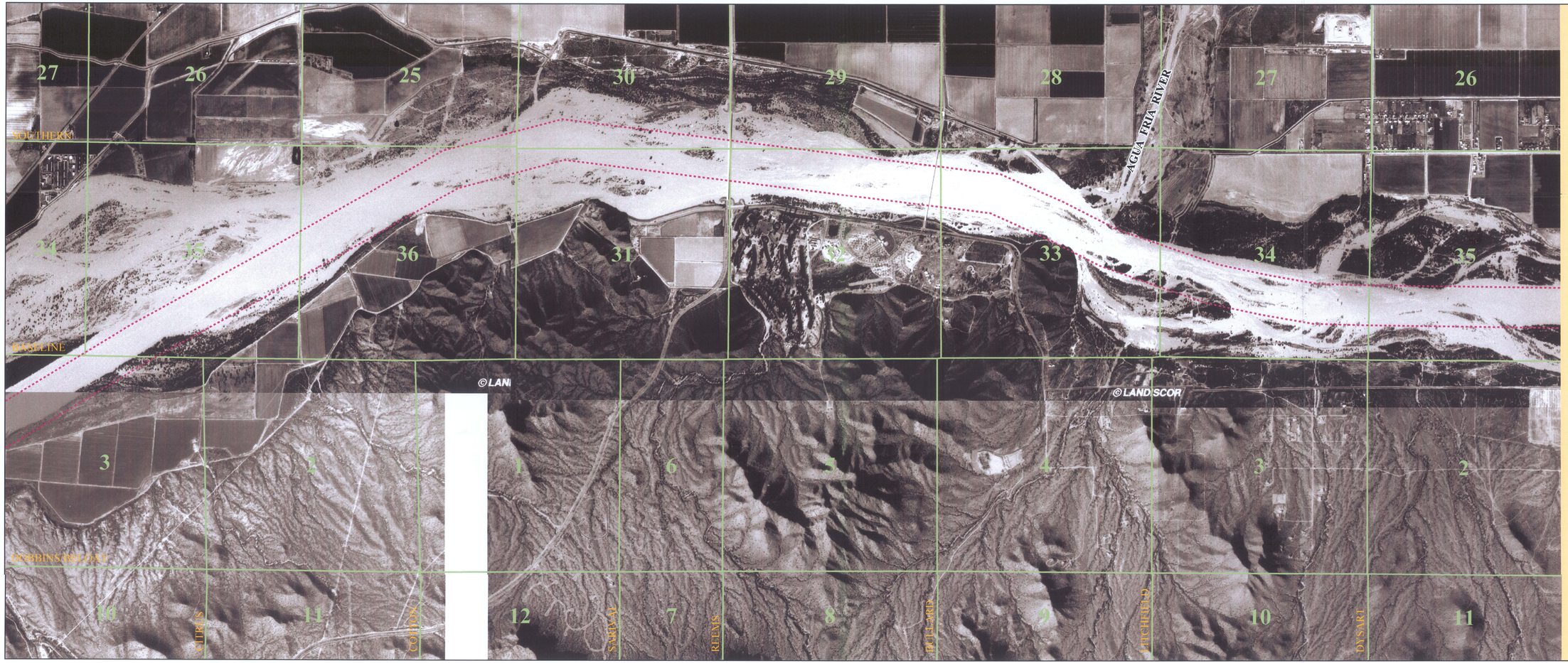
0 500 1,000 2,000
Feet

Notes:
Aerial photographs were taken during winter 1992.

Client/Project:
El Rio

Title:
FIGURE A2-8
1992 AERIAL PHOTOGRAPHS
RAINBOW TO CITRUS

Produced by: BGS
Date: 08/24/2005



Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009

EL RIO WATERCOURSE MASTER PLAN
FCD 2001C024

Consultants:
Stantec Consulting Inc.
8211 S. 48th St
Phoenix, AZ 85044

Legend:
LIMITS OF CLEARING

N
W E
S

0 500 1,000 2,000
Feet

Notes:
Aerial photographs were taken during winter 1992

Client/Project:
El Rio

Title:
FIGURE A2-9
1992 AERIAL PHOTOGRAPHS
CITRUS TO DYSART

Produced by: BGS
Date: 08/24/2005

Attachment 3:

Input for the Base HEC-6T Model

```
T1    El Rio Watercourse Master Plan 82000240
T2    Prepared for Flood Control District of Maricopa County
T3    Stantec Consulting Inc., Aug 2005

      File Name: base.T5
      Existing Conditions- Full model hydrology
      63 days of streamflow selected from 1920-2004 historic records
      12 days of streamflow taken from the synthetic 100 year hydrograph
      Hydrology input seperately for the Salt and Gila Rivers at thier confluence
      Salt River is modeled as the main stem
      The Gila River upstream of the confluence is modeled as a local inflow at RM 198.96
      Geometry from Micheal Baker Jr Inc, 1999. Floodplain Delineation Study
      and West Existing Conditions model for King Ranch and Cotton Lane
      Model limits from RM 178.61 to RM 199.07
      West model limits from RM 186.87 to RM 195.75
      Topography for Baker and portions of West model from 1992/93
      New topography (2004) used in West model from RM 189.02 to RM 194.21
      Bank Stations are set at lateral limits of 1993 flood
      Bed Material from RM 190.05 to 199.07 represents coarser (sand and gravel)
      size material entering from the Salt River
      Bed Material from RM 178.61 to 187.24 is finer (sand)
      size material that comprises the majority of the Gila River
      Seperate sediment inflow rating curves are used for the Salt and Gila Rivers
      Inflowing sediment rating curves developed from analysis and interpretation
      of USGS data collected near Gillespie Dam
      Inflowing percent sediment was determined by George Sabol- Aug, 2005
      Salt River-includes clay, 4 silt sizes, 5 sand sizes and 1 gravel size
      10% of the total inflowing sediment load is coarser than 0.062mm (sand and gravel)
      Gila River-includes clay, 4 silt sizes and 5 sand sizes
      20% of the total inflowing sediment load is coarser than 0.062mm (sand)
      Cross sections coded left to right facing downstream.
      Channel Manning's roughness set to 0.03
      Overbank roughness is conveyance weighted overbank 'n' from Baker model
      Sediment transport is by Yang's Stream Power Function

NC0.0500   0.059   0.030    0.10    0.30
X1178.61       9619311.9021680.20    0.00    0.00    0.00
XL                      17364.2023409.84
GR 824.314528.70  823.6014600.40  821.3014814.30  819.7015026.40  818.2015166.30
GR 819.015216.20  814.9015284.90  814.6015497.70  814.7015721.20  814.9015777.20
GR 815.715957.90  815.3016149.50  814.9016293.50  814.9016342.40  815.0016475.10
GR 813.216632.60  811.8016765.40  812.4016988.40  811.9017151.90  812.5017364.20
GR 812.417537.50  811.5017692.10  811.3017767.20  808.1017796.90  811.5017889.40
GR 806.718004.90  808.2018176.70  810.6018312.70  814.1018365.70  797.4018504.00
GR 802.718663.30  802.2018842.90  804.5019039.50  803.4019152.30  805.5019183.70
GR 804.119290.00  806.2019310.10  807.6019311.90  802.3019318.30  802.3019336.90
GR 802.219491.80  806.9019508.60  806.9019554.10  806.2019693.00  802.3020520.30
GR 807.620539.60  806.8021104.00  807.3021144.40  807.9021475.70  808.1021642.10
GR 807.321647.50  814.1021680.20  803.4021764.00  808.1021807.50  808.2021994.00
GR 807.822136.50  803.7022207.30  803.4022349.00  804.3022501.60  805.0022656.00
GR 805.422835.50  805.6022971.90  803.9023060.90  807.7023079.10  809.1023079.20
GR 803.823115.40  809.5023164.80  808.9023261.50  812.1023299.00  809.4023342.50
GR 809.323498.80  809.4023734.00  809.3023796.40  809.2024040.50  809.3024154.00
GR 809.724302.30  815.4024389.30  814.0024423.70  814.4024543.50  813.6024778.70
GR 813.524927.10  814.0025220.00  814.1025315.80  814.2025449.60  815.3025587.30
GR 817.425766.60  818.7025998.20  818.7026009.30  818.7026260.10  819.0026357.70
GR 820.226557.10  819.9026707.40  820.6026865.00  821.8026899.50  828.4026942.00
GR 824.526995.30
HD178.61      10
HE178.61

NC0.0470   0.052   0.030    0.10    0.30
X1178.68       9619279.7021601.40  360.00  390.00  378.34
XL                      17392.1024283.80
GR 824.314468.80  823.9014500.80  822.1014690.90  820.8014833.30  820.3015004.20
GR 818.815151.30  815.5015186.30  815.5015351.40  815.2015564.50  815.4015613.90
GR 815.315768.10  815.3015845.00  815.3015982.50  814.9016152.00  814.8016289.50
GR 816.716416.90  813.7016431.30  813.1016609.90  813.0016699.70  812.9016863.60
GR 813.016931.70  812.3017124.20  812.2017166.10  811.5017392.10  811.1017611.50
GR 811.517750.40  812.6017784.80  808.9017798.20  808.6017830.10  812.1017870.90
GR 808.118022.10  808.6018181.70  810.1018306.50  813.0018358.30  801.8018493.80
GR 797.618557.60  802.8018701.20  804.1018861.10  801.3019018.50  804.8019100.10
GR 803.919257.20  805.0019279.70  807.3019469.00  803.4020283.10  807.0020295.90
GR 805.521260.00  806.3021329.40  806.8021601.40  804.5021698.20  809.4021721.70
GR 810.121740.90  815.6021759.90  811.2021799.70  811.8021808.00  818.3021828.00
GR 803.721908.50  802.8022004.90  804.8022190.80  804.9022327.00  805.2022446.40
GR 806.422638.50  807.0022676.60  805.5022986.80  805.6023063.60  810.4023126.70
GR 805.923209.00  812.7023251.90  813.4023318.10  805.0023344.70  813.3023391.00
GR 813.723416.40  810.9023441.90  810.9023756.50  810.5023944.30  810.0024159.20
GR 809.224242.00  815.9024283.80  813.8024317.20  813.5024551.30  814.2024777.00
GR 814.425113.20  814.6025238.10  816.1025436.70  816.0025564.20  818.0025578.50
GR 817.425595.60  816.8025883.20  816.8025909.90  817.2026105.50  818.1026338.90
GR 818.426417.60  819.9026568.20  820.3026710.40  823.8026824.50  827.9026865.70
GR 827.826889.00
HD178.68      10
HE178.68

NC0.0550   0.065   0.030    0.10    0.30
X1178.77       8919442.9021488.00  445.00  440.00  444.41
XL                      17594.3024243.80
GR 827.314564.30  822.4014723.50  820.5014770.10  822.6014791.80  818.6014831.30
GR 822.614833.20  818.4014859.30  821.7014937.00  818.9014998.60  821.4015027.00
GR 819.815183.90  815.2015307.30  815.4015395.80  817.4015454.70  821.5015499.50
GR 820.515611.20  818.4016312.80  815.2016370.10  812.6016503.60  815.0016594.10
GR 814.916721.00  814.7016878.10  814.7016899.60  814.3017077.00  814.0017174.60
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GR 813.217295.20  813.1017446.50  812.0017594.30  812.2017658.40  814.9017737.80
GR 806.817764.80  812.2017852.40  809.5017970.60  809.7018118.50  808.9018241.90
GR 809.318275.30  809.6018417.80  809.9018501.40  806.5018550.50  800.0018679.80
GR 803.618779.10  802.1018859.10  803.7018924.60  801.2018995.80  803.7019142.00
GR 803.919198.00  805.5019442.90  804.5019566.90  806.3019720.10  804.7020056.90
GR 806.220062.20  804.1021488.00  804.6021558.70  806.3021690.20  806.6021708.00
GR 804.121723.80  809.9021806.00  805.3021834.30  805.2021978.40  807.7022223.80
GR 808.322390.70  807.1022434.10  804.5022517.40  808.1022534.20  808.8022676.90
GR 809.822766.60  808.3023113.00  808.1023145.50  805.9023175.70  812.8023200.10
GR 813.523381.80  813.9023554.70  808.0023579.00  810.3023616.20  809.1023714.80
GR 810.323843.60  813.1024074.80  814.9024220.90  816.2024243.80  813.8024263.80
GR 814.224818.60  814.5025346.20  814.7025472.80  817.3025518.60  817.2025593.70
GR 818.226485.70  819.2026697.80  822.3026776.80  825.4026797.20
HD178.77      10
HE178.77

NC0.0650   0.065   0.030    0.10    0.30
X1178.86      9419563.3021393.30  470.00  485.00  477.98
XL                      17700.0024108.50
GR 827.514602.50  826.0014696.50  821.6014716.80  827.1014739.50  823.7014764.50
GR 822.214941.00  821.6014968.70  818.9014985.80  824.3015009.20  824.1015031.60
GR 819.415068.30  820.4015077.50  817.7015106.70  817.6015129.90  817.9015315.50
GR 817.515545.70  817.1015763.00  817.1015844.30  817.4015974.80  817.4016117.30
GR 816.416242.90  816.4016423.10  816.6016496.10  815.2016831.40  812.8016976.40
GR 815.817140.30  816.5017268.30  816.9017420.30  816.9017466.30  816.1017603.30
GR 815.517763.80  814.5017866.10  810.6018007.60  809.5018078.30  810.0018235.90
GR 809.018361.20  810.0018443.50  811.5018452.70  807.2018463.30  802.9018469.10
GR 800.918546.10  800.6018724.40  804.8018895.20  803.9019047.10  804.7019101.70
GR 807.819335.60  808.2019563.30  807.5019647.30  806.2019797.00  805.6019934.80
GR 805.220711.30  805.1020776.00  807.0021297.80  808.6021393.30  808.1021635.60
GR 808.121796.60  812.5021891.70  810.9022049.90  809.1022207.90  808.7022371.30
GR 809.422518.80  810.3022970.70  812.1023074.20  814.9023160.70  813.2023252.80
GR 813.423395.30  812.5023500.80  811.3023686.20  811.0023780.40  807.1023808.90
GR 809.723856.50  815.6024108.50  814.3024146.20  815.0024671.40  815.4025365.00
GR 817.325432.20  818.1026171.60  818.4026442.90  818.5026588.60  819.0026643.90
GR 821.126664.90  825.1026684.80  823.6026726.90  821.0026735.60  822.3026751.00
GR 812.326763.50  811.6026781.40  823.4026799.20  823.3026933.00  823.9027097.20
GR 825.027117.70  825.5027253.30  826.0027382.10  826.5027465.90
HD178.86      10
HE178.86

NC0.0320   0.126   0.030    0.10    0.30
X1178.95      9519235.6021459.00  465.00  470.00  470.20
XL                      18026.2024181.70
GR 825.614685.40  825.4014688.60  823.8014817.10  822.5014980.20  819.0015077.30
GR 823.315096.00  823.1015118.00  819.5015140.00  817.1015199.20  816.7015341.80
GR 816.715402.40  817.0015581.60  817.0015633.80  817.2015765.60  817.6015927.70
GR 817.416064.00  815.7016185.80  817.5016248.90  818.0016411.30  816.2016575.20
GR 815.816702.10  817.6016828.80  814.1016967.00  814.7017088.00  816.6017265.30
GR 816.817273.50  816.9017389.50  817.1017580.60  816.7017716.20  816.0017863.50
GR 816.117985.40  817.3018026.20  814.4018074.20  813.6018170.00  803.9018208.70
GR 800.118218.90  799.6018325.60  803.7018504.40  804.7018666.70  804.7018706.70
GR 805.218823.40  807.6018932.60  808.4019133.00  809.2019235.60  807.4019351.80
GR 804.819432.60  805.0019739.80  806.3019818.50  809.1019868.70  809.2019995.50
GR 808.920132.10  805.4020162.80  806.0021014.20  806.0021147.90  807.1021285.60
GR 808.821459.00  810.8021701.50  811.2021820.50  812.5021944.00  812.7022048.50
GR 808.622094.60  811.1022251.00  811.1022388.00  811.2022590.00  810.3022747.30
GR 809.722827.30  815.9022968.60  810.6023115.60  808.4023179.30  809.5023300.50
GR 810.523399.80  808.2023416.70  807.3023484.00  811.4023594.00  811.9023713.40
GR 813.723892.40  813.8023983.00  808.5024029.90  812.3024051.60  816.5024181.70
GR 815.124220.70  815.4024278.50  815.8024416.30  816.4025055.40  815.8025273.20
GR 817.625338.00  817.5025483.70  818.1025633.20  818.6026051.90  819.0026533.40
GR 819.426542.70  821.7026549.30  820.6026564.70  825.6026585.00  823.9026599.10
HD178.95      10
HE178.95

NC0.0650   0.081   0.030    0.10    0.30
X1179.03      9619170.3021039.40  420.00  415.00  416.83
XL                      17642.9024157.70
GR 825.514605.70  829.4014622.80  825.5014631.50  823.8014834.80  824.7014933.30
GR 823.115100.20  817.5015178.50  823.5015221.90  816.5015325.60  816.7015346.20
GR 817.215551.80  817.3015807.80  817.7016029.00  818.4016187.40  817.3016451.90
GR 816.116672.20  817.6016873.60  817.8016958.60  813.9017048.40  816.5017255.60
GR 817.617509.30  819.0017642.90  817.6017765.90  816.5017770.59  805.9017815.80
GR 808.917914.20  802.8018123.00  805.7018189.60  807.6018422.20  811.8018554.20
GR 808.118777.00  807.6018821.70  806.6019074.30  807.8019170.30  803.9019345.30
GR 806.019708.80  808.0019955.80  806.8020168.40  806.0020273.40  807.2021039.40
GR 808.921288.20  812.0021593.50  813.7021800.00  808.1021831.60  809.3022074.00
GR 809.722283.50  810.4022589.40  811.8022721.70  810.4022731.20  814.5022755.70
GR 818.322800.50  824.4023040.90  820.8023181.60  813.4023230.90  808.5023365.70
GR 815.123430.50  810.7023462.80  810.8023499.00  817.7023538.50  811.9023592.80
GR 813.923763.40  812.6023872.70  808.1023998.60  809.3024032.30  816.7024079.40
GR 814.824091.10  816.1024101.50  808.1024114.00  808.2024135.40  817.3024151.40
GR 820.624179.80  817.2024257.40  817.4024376.60  817.4024660.80  817.2024907.60
GR 817.325127.70  817.1025219.30  818.9025237.90  817.1025245.10  820.1025269.30
GR 818.025291.90  818.3025495.90  818.7025737.10  819.1026025.60  819.1026064.50
GR 819.226273.20  819.9026479.10  824.5026570.50  821.3026581.80  821.9026597.10
GR 810.626613.00  810.0026627.50  821.7026651.90  823.0026855.50  823.2026953.60
GR 825.226983.80
HD179.03      10
HE179.03

NC0.0650   0.150   0.030    0.10    0.30
X1179.11      9418679.2021482.20  425.00  425.00  425.80
XL                      17584.8024134.80
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GR 827.514600.40  824.9014832.10  822.9015075.90  820.5015247.70  817.6015279.00
GR 822.215305.00  820.0015367.10  816.8015389.40  816.8015577.20  816.5015785.40
GR 817.916119.70  817.8016327.40  817.5016532.80  817.3016718.60  817.3016934.20
GR 817.417117.10  815.4017354.40  817.6017394.20  816.2017557.80  819.2017584.80
GR 816.917591.99  807.8017621.10  804.9017675.90  805.2017705.80  806.4017901.00
GR 808.318119.90  809.7018273.40  816.4018412.60  812.0018679.20  806.5018968.00
GR 806.119242.20  806.4019301.80  806.7019664.80  808.3019897.70  807.6020083.70
GR 808.420313.00  806.7020325.80  806.8021022.40  806.9021211.70  808.4021482.20
GR 810.121555.90  809.8021607.10  811.7021629.00  809.3021807.00  809.2022233.00
GR 810.622576.90  813.1022815.10  816.1022901.70  816.6023116.10  808.9023185.30
GR 813.323385.20  817.1023571.20  811.0023616.90  812.2023668.10  818.1023678.70
GR 812.823720.80  814.4023731.80  809.6023919.90  808.0023957.40  815.3024011.40
GR 816.424114.50  821.2024134.80  820.6024159.60  816.8024175.90  817.8024187.90
GR 814.524192.90  808.5024197.90  808.2024218.50  817.7024237.90  820.8024260.50
GR 817.324315.30  817.6024440.00  816.5025119.50  820.2025205.10  817.6025226.10
GR 817.525312.10  818.3026160.60  818.9026354.70  819.0026421.50  825.8026461.70
GR 824.826502.60  820.2026516.60  821.2026531.80  808.8026547.40  809.1026562.00
GR 823.526589.70  824.1026605.10  821.4026630.00  821.3026848.50  823.4026860.00
GR 824.727042.80  824.8027284.20  825.4027553.70  827.2027735.40
HD179.11      10
HE179.11

NC0.0650   0.054   0.030    0.10    0.30
X1179.20      9519437.1021065.60  490.00  500.00  497.05
XL                      17491.4024233.50
GR 829.714710.20  826.5014917.80  823.1015126.90  821.8015208.40  825.3015242.90
GR 823.615354.60  821.2015369.30  822.5015403.20  818.2015446.60  817.7015664.20
GR 817.416019.30  818.1016230.10  818.3016433.60  817.8016703.10  818.1016904.40
GR 815.616968.40  819.1017096.10  818.4017199.20  816.3017216.50  816.5017353.50
GR 811.117398.10  811.1017421.40  817.8017444.90  818.3017491.40  817.5917494.25
GR 808.317531.40  805.4017635.70  807.7017894.60  810.4018127.50  808.5018287.90
GR 815.518447.40  813.8018561.10  810.4018698.50  811.1018756.30  807.7018851.90
GR 809.519055.90  803.8019093.40  808.7019279.20  808.5019376.70  811.7019437.10
GR 808.419790.00  809.6020036.80  807.8020259.60  806.3020303.30  807.3020520.50
GR 808.220645.80  809.2021065.60  808.6021268.30  809.3021480.00  807.1021670.80
GR 810.322001.20  811.8022466.30  815.0022776.90  815.7022951.50  809.4023008.80
GR 814.923230.90  814.9023239.30  818.5023500.60  818.2023709.90  811.7023843.00
GR 816.123867.60  809.8023898.10  816.2024074.90  815.2024171.00  821.5024213.00
GR 822.324233.50  817.0024251.50  817.0024268.90  808.5024281.70  808.2024304.70
GR 818.724322.00  821.4024354.90  817.6024410.00  817.3024540.60  816.6025044.80
GR 820.725100.30  818.7025149.40  818.2025464.70  819.0026166.80  821.2026335.90
GR 825.926362.90  823.3026407.20  820.4026430.80  808.6026442.70  809.0026463.70
GR 823.126485.60  823.7026518.10  821.7026534.40  823.5026738.40  825.8026857.20
GR 827.827075.30  827.0027380.00  826.6027429.80  826.8027630.90  828.0027670.30
HD179.20      10
HE179.20

NC0.0650   0.107   0.030    0.10    0.30
X1179.25      9719388.2021199.80  230.00  280.00  259.41
XL                      17520.6024000.00
GR 831.114621.10  829.3014834.00  827.9015081.20  823.7015140.10  826.5015157.50
GR 822.315332.50  822.3015406.60  819.9015410.60  821.9015417.50  820.9015522.30
GR 817.215730.40  817.3015938.50  819.2016213.40  819.4016437.00  819.5016668.20
GR 819.516891.90  818.8017039.10  819.8017180.70  819.5017295.20  813.4017376.60
GR 818.317399.70  820.3017520.60  817.8317526.64  807.1017552.90  808.4017795.40
GR 811.317912.80  810.0018008.60  811.9018053.00  811.1018255.10  816.7018379.20
GR 813.418616.10  807.8018776.70  811.1018862.30  810.4019010.60  806.3019055.20
GR 809.219222.60  808.4019304.50  815.4019373.50  815.2019388.20  808.9019704.90
GR 809.719914.80  807.5020125.30  807.3020326.60  809.1020735.70  809.6020960.80
GR 810.421199.80  811.8021408.00  811.2021633.80  809.3021842.90  808.5021921.80
GR 810.421967.20  812.2022320.50  812.2022492.50  811.8022700.40  811.8022925.00
GR 809.922993.60  816.0023135.70  816.4023217.60  807.5023255.30  808.1023400.20
GR 819.223422.30  813.6023639.50  810.7023724.60  815.2023850.00  815.8023971.50
GR 818.424234.20  813.8024335.10  824.4024410.00  824.3024446.00  818.1024462.90
GR 819.524487.80  808.8024514.90  809.4024555.50  820.4024617.00  821.2024702.20
GR 818.324781.30  818.0024999.90  819.3025247.30  818.7025578.30  819.9025923.80
GR 819.926164.60  821.8026280.60  825.5026302.90  824.2026344.50  819.4026372.00
GR 814.126376.90  808.7026384.80  810.6026404.80  822.6026427.00  823.1026644.80
GR 824.326887.00  824.5027101.60  825.2027238.90  826.4027465.70  828.1027676.90
GR 828.127777.50  832.7027791.30
HD179.25      10
HE179.25

NC0.0650   0.044   0.030    0.10    0.30
X1179.30      9719361.7021157.30  230.00  280.00  258.47
XL                      17568.6023605.30
GR 832.814539.80  832.3014727.10  828.4014937.00  826.6015107.70  822.1015138.40
GR 825.215157.50  823.8015285.20  821.5015291.40  818.0015495.80  817.4015683.80
GR 817.615882.20  818.4016107.00  819.0016309.80  819.5016501.70  819.3016690.70
GR 818.616881.50  821.2017084.20  820.4017191.20  817.9017206.30  820.0017215.80
GR 819.617281.20  815.8017298.60  817.9017325.90  820.3017549.70  820.6017568.60
GR 818.317573.63  807.2017598.20  807.1017912.80  811.6018114.40  811.4018239.00
GR 819.518379.70  814.5018487.70  815.0018633.40  807.5018768.60  810.7018814.80
GR 811.718905.00  806.8019035.20  812.2019157.60  814.7019361.70  815.5019409.50
GR 808.419446.20  808.3019459.00  808.5019712.30  808.7019931.80  808.4020278.00
GR 808.520472.40  810.4020958.50  811.5021157.30  810.8021338.50  811.3021561.50
GR 809.221719.00  809.8021847.20  806.8021866.90  807.1021900.60  812.2021934.80
GR 812.422129.30  812.3022172.90  811.4022368.90  812.4022569.90  813.0022853.00
GR 812.823048.00  815.8023153.30  816.4023413.20  812.1023537.00  819.8023605.30
GR 817.523809.90  817.2023915.90  812.0024002.60  809.6024024.00  813.5024055.60
GR 812.924068.80  821.6024126.30  821.4024145.10  818.3024361.10  819.9024564.90
GR 819.224766.20  818.3025010.40  817.2025269.70  819.5025592.10  820.2025779.50
GR 822.626066.90  823.0026221.40  825.4026272.40  822.0026296.00  822.6026304.50
GR 808.926325.50  809.2026345.10  820.6026363.80  822.1026383.40  822.2026602.80
GR 823.826866.60  824.4026947.60  824.7027223.50  824.7027225.80  825.4027416.10
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GR 827.227659.60  831.4027771.40
HD179.30      10
HE179.30

NC0.0650   0.038   0.030    0.10    0.30
X1179.35      9719420.8020908.80  240.00  275.00  261.22
XL                     17638.7023364.60
GR 832.314411.00  830.9014642.30  828.1014857.30  826.9015065.50  825.9015101.70
GR 820.115125.30  825.5015150.50  825.3015171.60  820.8015182.40  823.9015194.40
GR 820.315414.90  820.0015625.60  819.4015923.10  820.0016143.30  819.9016364.40
GR 819.916668.20  819.9016752.80  819.8016973.10  818.7017184.80  819.3017393.80
GR 818.417599.60  819.9017638.70  818.6117644.33  808.7017687.50  807.2017964.90
GR 810.118177.40  812.2018377.00  811.8018452.30  815.8018532.60  815.7018785.90
GR 813.918841.00  810.2018862.40  811.8018871.70  807.7018948.40  814.3019191.30
GR 813.419288.40  815.5019318.80  814.8019420.80  808.5019433.70  808.7019741.30
GR 808.919975.40  808.5020227.60  808.2020358.80  811.0020833.00  811.3020854.00
GR 813.320856.80  816.0020908.80  813.2020940.40  814.1021000.00  811.0021042.40
GR 811.221263.70  811.2021542.70  808.9021675.00  811.4021748.80  807.8021758.00
GR 811.521822.10  809.5021996.50  810.9022054.70  809.6022220.40  810.0022435.80
GR 815.122563.90  814.3022783.60  816.0022898.90  814.0023137.40  812.3023217.80
GR 809.323259.50  817.6023349.90  820.9023364.70  818.9023612.30  819.3023864.60
GR 821.023990.20  809.6024070.30  816.1024087.30  814.1024144.50  820.8024202.50
GR 819.024407.70  819.1024639.00  820.5024920.40  819.8025180.10  819.5025403.80
GR 821.625648.80  820.0026001.60  821.3026152.80  825.5026228.60  821.1026238.80
GR 822.826253.30  808.9026272.00  810.0026290.80  822.8026309.30  823.2026515.30
GR 821.326588.60  823.7026927.60  824.1027141.90  825.0027380.10  827.0027597.40
GR 830.027811.60  831.1027961.10
HD179.35      10
HE179.35

NC0.0650   0.045   0.030    0.10    0.30
X1179.40      9719410.7020846.40  240.00  280.00  262.49
XL                     17784.5023406.30
GR 829.614523.10  827.2014800.40  825.0015056.30  820.5015077.70  825.7015103.50
GR 826.215120.50  821.7015132.20  824.5015145.60  820.0015419.80  819.8015726.00
GR 819.716002.50  820.9016317.30  821.3016605.10  820.9016943.80  821.3017010.00
GR 817.617037.10  821.7017051.70  820.5017327.10  819.4017607.50  820.1017784.80
GR 818.917787.45  805.2017816.70  810.7018153.20  812.7018305.30  811.7018374.60
GR 815.118662.90  808.5018937.20  815.0019149.70  813.7019255.20  816.2019312.10
GR 816.619410.70  813.5019417.90  812.8019472.10  808.9019484.20  809.2019592.30
GR 809.819898.10  810.5019973.60  808.6020417.30  808.4020490.60  808.3020830.50
GR 815.520846.40  813.4020949.30  814.4020978.50  811.4021012.80  813.0021306.50
GR 811.121608.00  807.8021629.50  812.5021793.30  808.6021828.90  815.0021870.00
GR 809.522076.80  813.5022347.10  812.0022460.10  815.2022502.90  814.5022602.40
GR 816.922738.50  814.6023015.10  813.7023215.00  815.8023283.60  814.0023287.50
GR 815.823320.10  818.9023336.70  821.4023406.30  819.8023743.60  822.0023780.50
GR 816.323857.10  825.0023881.40  822.4023924.40  822.8024073.10  819.6024079.80
GR 819.824104.70  813.1024117.60  811.1024144.60  817.9024161.40  813.6024232.20
GR 820.524352.00  820.5024730.00  820.3025049.40  822.6025170.40  820.5025544.30
GR 822.325832.20  823.0026103.80  826.3026168.90  822.6026183.40  822.1026201.60
GR 809.026214.90  810.7026228.90  822.9026248.80  824.7026476.30  820.9026510.50
GR 823.726890.60  825.6027194.00  827.0027528.70  827.2027586.30  829.2027594.90
GR 829.727957.00  830.1027987.00
HD179.40      10
HE179.40

NC0.0320   0.039   0.030    0.10    0.30
X1179.50      9719470.1020916.90  465.00  535.00  506.43
XL                     17532.2023405.50
GR 832.414198.20  830.1014488.20  828.4014526.10  832.4014543.30  829.1014552.00
GR 826.914873.90  825.8014964.40  821.3014992.60  827.0015016.70  827.7015030.60
GR 822.815036.90  825.0015090.60  821.7015381.60  820.5015687.70  821.5015973.50
GR 821.416259.20  821.0016555.30  822.2016847.90  818.3016942.90  821.8016957.30
GR 820.917245.50  822.1017532.20  820.0017836.90  819.5417842.36  817.6017865.40
GR 812.817892.80  812.5017990.40  808.6018116.80  813.3018445.80  814.8018740.80
GR 808.818941.20  811.0018963.40  819.8019196.80  816.4019470.10  813.3019487.80
GR 812.119593.60  810.2019609.50  810.1019764.10  810.1020175.70  810.4020390.90
GR 810.520767.10  816.0020776.70  814.6020852.50  816.3020916.90  812.4020999.70
GR 814.821127.20  810.6021421.80  812.4021514.40  808.5021575.00  817.9021697.00
GR 819.121736.20  815.4022130.00  816.6022414.40  811.7022454.30  811.7022553.70
GR 816.022590.00  815.9022901.20  815.8023287.10  822.1023405.50  812.7023435.80
GR 819.123475.00  817.9023482.90  820.5023679.20  815.6023740.10  820.5023808.30
GR 822.923878.60  821.7024212.00  821.0024306.30  816.4024325.60  816.8024341.00
GR 813.024370.90  817.9024398.70  816.6024443.10  818.8024496.90  820.5024962.50
GR 820.925337.50  820.5025678.80  819.6025973.70  827.0026022.20  824.9026065.90
GR 822.126074.50  823.8026091.40  810.7026103.50  812.6026118.30  824.5026138.50
GR 824.026156.20  820.6026165.90  823.2026312.50  821.2026381.00  823.4026857.60
GR 825.427189.10  826.9027472.50  830.0027482.20  829.8027769.90  830.0027981.40
GR 832.328001.30  833.5028230.80
HD179.50      10
HE179.50

NC0.0320   0.065   0.030    0.10    0.30
X1179.59      9519398.1020891.90  455.00  540.00  504.22
XL                     17617.5023702.70
GR 835.114631.80  828.6014710.30  832.4014794.00  826.0014857.50  825.4015008.80
GR 830.215042.90  824.6015113.90  822.8015375.70  821.6015761.30  821.8016090.50
GR 822.216342.90  822.2016612.60  822.5016821.20  820.5016849.50  822.9016864.70
GR 821.917140.80  822.0017414.90  822.4017617.50  808.8017662.90  814.9017702.30
GR 815.217784.80  819.8017865.20  814.3017993.00  817.6018194.40  814.1018510.20
GR 814.918685.30  812.1018780.50  808.2018847.40  810.3018917.20  809.0018995.70
GR 816.319096.60  819.0019398.10  818.1019546.20  811.2019570.50  811.1019592.10
GR 811.219948.00  811.1020194.60  811.1020705.60  818.5020714.70  814.5020891.90
GR 812.320905.50  811.0021161.80  812.5021296.90  809.6021310.60  809.7021371.90
GR 817.921401.00  819.8021454.80  815.3021697.80  818.6021810.60  818.2022091.70
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GR 817.822350.20  819.5022471.80  817.1022501.90  811.4022530.80  811.4022571.60
GR 816.422599.50  818.8022857.40  820.2023060.70  816.8023370.30  817.0023405.30
GR 819.423423.00  821.7023702.70  821.2023929.30  816.9024011.60  818.5024211.50
GR 816.324233.90  821.2024290.60  820.7024415.50  816.1024457.70  816.1024472.90
GR 812.724513.90  821.7024617.10  822.5024996.20  819.2025130.00  820.3025449.60
GR 819.425773.90  821.2025895.70  825.6025919.10  823.4025962.80  819.9025969.70
GR 820.525986.90  809.7025998.70  810.3026012.10  822.0026036.10  823.2026056.80
GR 822.126387.90  822.8026732.90  825.4027029.00  826.4027284.50  828.2027343.60
GR 826.027351.10  829.1027472.70  830.4027740.10  833.2028200.10  833.7028251.90
HD179.59      10
HE179.59

NC0.0430   0.065   0.030    0.30    0.30
X1179.68      9519409.2020965.10  425.00  570.00  494.98
XL                     17419.3023694.60
GR 841.114702.30  829.7014852.50  827.7015072.80  826.6015293.80  823.8015530.40
GR 823.515775.60  823.1016017.70  822.6016232.10  822.0016475.90  821.7016701.20
GR 821.216762.20  824.0016807.20  822.3017031.10  823.3017262.90  823.8017293.30
GR 819.917340.70  821.2017419.30  816.1017504.20  818.9017651.90  819.0017869.60
GR 818.118080.00  821.7018300.20  816.3018530.60  812.0018746.50  809.0018902.10
GR 812.019034.60  808.3019063.20  810.9019096.20  816.0019121.40  816.4019227.00
GR 820.519306.70  817.9019317.90  820.4019409.20  818.7019590.60  814.0019608.20
GR 811.819659.00  811.9019849.30  812.1020661.70  818.3020679.00  816.7020709.20
GR 817.520742.60  810.9020808.00  813.3020965.10  811.2021048.60  819.4021083.20
GR 821.321310.50  823.1021367.90  818.1021515.20  818.9021590.00  815.2021766.00
GR 818.221876.30  817.7022151.80  819.5022384.40  820.2022489.90  811.1022510.70
GR 811.122620.00  819.1022653.20  817.4022991.60  817.5023297.80  817.5023513.90
GR 819.823628.20  822.2023694.60  821.5023972.10  821.0024252.80  822.3024496.10
GR 821.824578.50  816.7024615.10  817.5024632.00  811.8024655.30  821.5024767.80
GR 821.625000.80  823.8025078.50  821.4025198.50  820.9025427.10  820.6025660.60
GR 822.225788.20  826.4025813.90  826.3025840.30  821.1025862.10  821.5025881.70
GR 809.825897.30  811.0025907.40  824.0025933.40  823.8025955.80  822.1026249.00
GR 823.826554.10  825.5026894.30  826.7027164.80  830.1027469.30  831.2027688.30
GR 833.227932.20  834.8028172.30  836.3028392.20  836.8028528.50  841.3028667.60
HD179.68      10
HE179.68

NC0.0430   0.065   0.030    0.30    0.30
X1179.76      9419435.9020987.00  395.00  395.00  401.33
XL                     17850.0023800.00
GR 830.715008.20  826.3015034.50  827.8015057.90  835.7015081.00  828.9015310.50
GR 828.015545.50  827.8015647.90  823.7015657.80  826.7015669.80  823.5015894.50
GR 822.716129.90  822.1016356.60  822.8016615.90  822.7016821.30  820.3016846.60
GR 823.616893.40  823.0017128.40  820.9017238.90  817.4017274.90  815.8017366.30
GR 820.817485.00  822.0017735.00  822.1017809.10  822.0017947.00  817.3017970.80
GR 819.518003.60  818.0018150.70  820.8018397.20  820.2018604.50  823.0018672.90
GR 821.718767.90  814.6018838.50  811.6019123.70  813.5019252.20  810.0019267.70
GR 809.519293.10  818.2019316.60  819.7019435.90  815.7019450.70  814.0019623.00
GR 814.319677.70  812.3019690.80  812.6020067.00  813.1020636.60  819.1020650.80
GR 809.820691.30  811.7020754.10  819.0020792.30  817.6020823.80  822.1020987.00
GR 820.021315.60  817.2021554.80  815.2021625.90  817.5021871.50  818.5022101.00
GR 819.522325.30  818.4022447.20  810.9022478.60  810.9022565.30  819.1022598.20
GR 816.522646.20  818.1022874.00  818.3023123.60  818.3023394.20  820.4023657.40
GR 821.723894.20  821.9024173.30  823.2024425.40  823.7024645.10  815.1024722.10
GR 811.624734.10  816.9024769.50  819.3024801.70  821.4025067.00  822.7025156.90
GR 818.325189.80  823.9025216.10  821.3025280.20  820.9025543.80  819.7025752.40
GR 826.925796.00  822.5025856.70  823.6025868.60  810.9025881.10  812.1025893.60
GR 823.925916.60  824.6026556.60  826.0026779.00  827.3026999.20  830.2027248.50
GR 830.927474.50  833.4027901.60  836.2028150.60  836.4028192.20
HD179.76      10
HE179.76

NC0.0430   0.065   0.030    0.30    0.30
X1179.84      9519472.3020878.20  395.00  394.00  399.92
XL                     18240.0023850.00
GR 842.515015.10  830.9015095.60  829.1015242.10  832.4015318.30  825.6015358.20
GR 826.515557.60  823.7015569.90  824.9015793.90  823.7016041.20  823.0016247.30
GR 823.116453.90  823.1016673.20  823.1016768.50  820.3016793.50  822.8016831.40
GR 823.417042.40  817.2017098.10  819.7017164.70  820.9017297.60  817.3017333.20
GR 821.517446.20  823.3017673.80  821.4017800.80  822.4017867.40  818.7017894.50
GR 818.818085.70  820.8018293.10  821.9018511.40  823.5018771.40  824.0018983.30
GR 820.319096.50  818.3019109.30  817.6019313.20  815.8019393.20  816.8019472.30
GR 815.319483.30  817.4019567.90  812.4019634.20  812.6019801.50  812.8020149.20
GR 813.820557.40  821.6020591.00  824.2020633.20  817.7020701.90  819.6020708.40
GR 822.220878.20  819.2021206.80  818.0021342.00  819.9021527.80  819.6021796.00
GR 817.421936.60  818.4022187.70  819.2022307.00  815.0022480.00  818.6022598.90
GR 818.222805.30  817.9023048.30  818.7023251.90  819.8023489.20  823.0023675.20
GR 822.123913.90  820.5024138.80  821.8024369.20  824.0024572.80  826.0024708.40
GR 817.224804.50  813.2024821.00  821.1024880.00  820.9025166.30  818.7025327.00
GR 821.725534.00  822.8025716.50  818.7025742.70  822.1025780.50  821.6025852.90
GR 826.925916.60  823.1025961.70  825.6025980.50  811.1025995.50  811.8026012.60
GR 824.826039.80  824.6026323.00  826.7026542.00  827.4026817.10  828.7027049.20
GR 830.727080.50  828.1027115.10  831.6027374.20  833.6027673.00  835.0027977.90
GR 836.828200.10  837.9028372.90  841.5028666.90  841.9028768.10  843.5028997.80
HD179.84      10
HE179.84

NC0.0430   0.065   0.030    0.30    0.30
X1179.91      9619462.2020969.20  405.00  405.00  409.73
XL                     18670.0023400.00
GR 835.114718.40  834.4014909.50  828.2015073.50  825.9015267.10  827.4015305.50
GR 822.715314.40  824.0015555.20  823.3015775.90  823.5016010.80  823.7016214.00
GR 823.716450.50  823.6016655.50  823.2016868.40  822.9016964.10  817.3017012.40
GR 822.917169.70  824.0017366.30  822.2017370.90  825.1017470.50  824.3017598.50
GR 819.017630.10  823.4017651.20  824.7017730.60  820.8017760.80  822.4018016.30
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GR 823.118222.70  822.7018411.20  823.5018635.10  823.2018857.10  823.7019037.80
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GR 812.919569.40  813.5019886.20  813.7019981.20  814.1020165.70  814.8020514.40
GR 814.920518.50  821.3020534.30  818.7020543.20  820.6020735.90  819.8020969.20
GR 820.021167.80  819.5021402.10  819.8021657.70  817.0021751.20  816.2021936.10
GR 816.522215.80  815.1022425.60  815.1022490.50  817.3022532.60  818.1022744.00
GR 817.222936.20  818.0023151.70  818.7023340.60  820.7023570.30  821.8023754.50
GR 822.923965.90  821.2024134.30  822.7024394.00  823.6024613.30  824.5024815.20
GR 818.524864.50  818.8024908.10  814.4024928.40  819.4024965.20  822.4025006.00
GR 823.025151.20  817.1025211.70  821.5025302.60  823.1025558.50  821.0025723.70
GR 818.225734.90  821.4025758.50  822.8025949.30  822.8026034.30  824.8026091.10
GR 824.526148.40  831.7026203.10  826.7026316.10  829.9026353.10  817.6026372.40
GR 818.526404.40  831.1026442.50  829.1026570.60  831.1026863.60  830.0027019.60
GR 832.027029.10  831.4027100.70  833.2027380.70  833.6027443.10  834.0027738.80
GR 835.627972.00
HD179.91      10
HE179.91

NC0.0430   0.065   0.030    0.30    0.30
X1180.04      6019572.6021045.40  559.00  719.00  605.10
GR 832.017151.50  834.0018172.90  837.5019238.80  830.7519238.90  830.2519241.60
GR 827.019246.43  823.9519251.00  823.5319399.00  823.5319408.00  818.9719563.60
GR 819.019572.60  811.1219614.50  815.2819728.30  815.2819737.30  815.1419892.90
GR 815.119901.90  815.0020057.60  815.0020066.60  814.8620222.20  814.8620231.20
GR 812.920365.30  820.5120386.80  820.5120395.80  823.8420551.50  823.8420560.50
GR 823.820665.80  824.3120716.10  824.3120725.10  822.7720880.80  822.7720889.80
GR 822.021045.40  822.0121054.40  819.7921210.10  819.7921219.10  818.8521374.70
GR 818.821383.70  818.4221465.80  818.2821539.40  818.2821548.40  818.4021704.00
GR 818.421713.00  818.3221868.70  818.3221877.70  818.3322033.30  818.3322042.30
GR 818.522198.00  818.5022207.00  818.3222362.60  818.3222371.60  818.6122527.30
GR 818.622536.30  819.5222691.90  819.5222700.90  820.3422846.00  827.0222856.02
GR 830.422861.10  830.9022863.70  837.6522863.80  836.0023184.00  834.0024281.30
HD180.04      10
HE180.04

NC0.0370   0.065   0.030    0.30    0.30
X1180.06      9619544.3020970.10  156.00  166.00  157.22
XL                    19544.3023004.00
GR 827.715155.30  826.3015392.60  825.6015631.50  825.4015710.20  823.5015714.60
GR 825.415720.50  824.5015908.20  824.3016101.10  824.4016287.90  825.4016493.70
GR 826.416667.10  818.3016699.90  818.0016721.10  825.8016778.80  825.4016790.50
GR 822.216801.20  824.6016976.80  826.3017161.80  825.6017340.30  825.4017689.60
GR 825.017867.90  825.1018084.60  820.8018194.40  821.1018600.80  821.1018632.90
GR 823.018852.70  822.4018883.30  826.8018930.90  827.9019097.50  822.2019146.70
GR 823.419329.40  827.3019445.00  829.6019465.70  829.4019506.60  825.3019544.30
GR 825.319563.30  815.1019576.00  815.3019704.20  814.7020018.70  814.4020239.80
GR 816.820438.60  815.8020621.60  815.3020840.10  815.2020943.40  823.5020959.50
GR 823.020970.10  821.3021146.10  819.7021245.60  820.9021466.30  820.9021490.30
GR 818.221875.70  817.4022076.70  817.4022403.90  817.5022419.00  818.9022799.50
GR 818.922809.00  818.2023188.40  819.6023342.80  822.1023579.40  822.2023658.40
GR 822.423837.90  821.6024039.80  820.6024281.60  822.6024472.10  822.7024515.30
GR 825.124770.80  826.3024945.10  822.9024971.20  822.3025001.20  823.1025039.10
GR 815.525051.40  815.7025058.00  824.9025077.30  826.1025117.80  820.9025135.90
GR 819.325154.10  822.3025197.80  823.5025414.20  824.1025661.60  824.1025917.10
GR 827.126099.70  827.2026118.20  827.1026389.00  827.5026621.00  829.1026799.80
GR 832.126922.40  832.6027061.60  834.5027076.10  832.9027112.60  832.9027287.70
GR 834.227522.80  834.4027641.50  838.8027657.80  837.0027683.00  836.8027860.70
GR 837.127984.00
HD180.06      10
HE180.06

NC0.0370   0.065   0.030    0.30    0.30
X1180.09      9619537.6021071.10  155.00  160.00  156.48
XL                    19537.6023167.80
GR 828.715120.60  828.4015295.90  827.9015511.60  826.5015688.80  825.4015724.10
GR 823.815727.30  826.2015732.00  824.7015905.50  824.8016081.90  824.9016273.40
GR 825.316460.00  826.1016647.90  826.3016678.30  818.2016702.30  818.2016737.30
GR 825.516776.60  823.4016804.70  825.4016998.20  826.3017177.60  825.5017355.40
GR 826.317556.00  826.0017766.60  822.6018025.50  824.6018268.40  825.0018447.10
GR 824.118539.60  824.0018706.30  823.7018837.00  822.9018896.70  827.6018939.00
GR 827.118955.40  830.2019000.20  826.9019011.00  822.5019084.20  822.8019301.50
GR 822.919448.80  830.1019476.70  830.3019504.30  824.1019522.10  825.2019537.60
GR 815.519562.00  815.4019586.60  814.6020197.30  816.2020375.30  817.5020556.00
GR 818.320739.20  818.0020905.70  815.6021022.80  824.1021033.00  822.2021071.10
GR 818.221375.00  817.0021475.10  816.9021722.10  816.7021787.70  816.5022216.60
GR 818.322395.90  819.2022630.30  819.5022746.00  818.4023135.20  821.8023324.00
GR 821.523522.20  822.0023692.00  823.0023874.30  822.9023935.20  822.7024171.50
GR 822.924301.70  823.2024483.60  823.7024675.30  823.4024870.10  824.8025042.20
GR 825.125064.60  816.0025076.30  816.9025086.90  824.8025104.90  825.8025145.30
GR 821.925156.00  823.6025366.10  824.8025552.40  825.5025786.00  824.9025964.00
GR 827.326130.00  828.5026369.10  827.5026613.60  829.7026817.70  831.6027020.70
GR 833.327053.40  832.6027162.00  834.5027359.50  834.8027532.10  837.7027708.50
GR 837.427908.10  837.3027945.90  837.5028143.40  838.2028200.40  841.7028209.30
GR 840.728433.00
HD180.09      10
HE180.09

NC0.0370   0.065   0.030    0.30    0.30
X1180.18      9619471.8021018.90  490.00  490.00  495.76
XL                    19471.8023646.00
GR 830.714868.50  830.0015056.90  829.4015247.20  826.8015479.10  828.4015651.90
GR 828.415737.40  825.0015746.40  826.4015750.60  824.1015810.50  824.4016009.70
GR 824.716199.70  825.3016387.80  826.3016589.30  824.9016683.10  826.4016693.90
GR 821.716713.30  822.7016752.20  829.5016780.30  829.5016798.00  824.6016809.70
GR 826.017000.30  827.7017193.90  826.5017384.00  827.2017501.90  823.7017638.60
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GR 825.317829.20  827.2017915.10  825.8018110.60  824.1018195.30  823.9018419.30
GR 823.918425.90  823.9018649.20  823.0018855.00  829.7018893.60  830.3018905.60
GR 823.718930.50  823.0019129.80  823.5019329.10  823.4019458.40  825.2019471.80
GR 818.519502.00  818.8019529.30  817.1019531.90  818.0019832.40  818.8020143.90
GR 821.020335.00  819.4020567.50  819.7020779.50  817.7020990.80  817.7021006.00
GR 826.421018.90  824.0021225.00  821.0021545.80  821.1021577.20  819.1021811.50
GR 818.621848.70  809.9021916.00  815.1022016.10  818.9022341.10  818.4022374.60
GR 820.622753.00  823.5022971.70  823.7022995.60  824.1023188.50  822.4023353.10
GR 824.723495.40  822.1023698.60  822.1023921.60  821.3024145.30  823.2024338.10
GR 825.124677.70  825.8024955.00  824.7025139.70  817.9025152.10  817.0025166.60
GR 819.825176.70  826.0025189.80  823.5025217.00  823.6025241.40  821.8025251.00
GR 823.625262.60  824.5025492.90  825.1025733.70  825.4025978.30  827.0026169.50
GR 828.126399.40  829.5026624.30  830.4026768.20  828.9026774.60  830.6026780.20
GR 831.226979.10  832.7027214.20  834.2027469.90  835.4027681.80  836.1027912.40
GR 836.627982.00
HD180.18       10
HE180.18

NC0.0370   0.065   0.030    0.30    0.30
X1180.28       9619401.3020943.80  505.00  505.00  507.80
XL                      19401.3024129.00
GR 833.514858.70  832.2015122.50  831.3015426.70  830.8015620.30  829.2015755.70
GR 826.315764.60  825.1015987.20  825.7016247.40  826.0016483.30  825.4016664.20
GR 827.916704.80  821.5016746.50  821.7016777.30  828.4016817.20  823.8016842.20
GR 825.016970.90  823.8017024.80  824.3017276.10  823.1017492.70  824.7017710.80
GR 825.318047.90  823.8018241.40  824.7018454.90  826.1018650.90  826.6018776.70
GR 831.618802.70  832.1018818.50  826.1018851.80  825.3019073.60  825.1019258.20
GR 829.719289.40  829.1019297.90  823.8019309.60  824.7019377.70  827.4019401.30
GR 817.619411.60  818.6019644.50  819.9019910.10  819.7020140.50  819.3020409.80
GR 819.220603.60  821.2020821.80  820.6020845.60  817.7020857.10  818.5020892.90
GR 829.620910.60  827.0020943.80  825.9021232.80  824.1021480.80  822.3021688.60
GR 822.221893.70  818.8022096.40  813.1022171.20  819.8022366.90  821.1022569.90
GR 819.722844.30  823.5023065.80  824.5023270.40  822.7023466.40  823.9023669.20
GR 823.823875.80  822.4024069.40  822.6024272.10  824.3024490.30  826.3024722.40
GR 827.024989.50  825.3025104.00  825.8025191.00  827.3025199.80  824.7025223.60
GR 817.025241.00  818.2025256.80  825.5025271.10  823.5025313.30  824.2025508.00
GR 824.225699.30  826.3026017.10  827.4026275.20  827.8026318.10  827.1026536.20
GR 828.026647.50  829.8026677.50  828.0026683.00  831.5026707.00  828.8026725.70
GR 830.226771.30  830.6026970.60  830.9027024.00  832.9027294.70  833.8027488.40
GR 836.127745.70  837.1028000.70  840.1028077.50  835.5028084.60  839.4028106.80
GR 840.428165.00
HD180.28       10
HE180.28

NC0.0350   0.144   0.030    0.30    0.30
X1180.37       9619327.4020796.20  540.00  470.00  510.23
XL                      19327.4024593.00
GR 836.914708.20  836.1014717.10  839.0014736.40  835.3014804.40  834.6015141.00
GR 831.615502.80  829.7015747.10  831.0015784.30  827.6015802.70  826.7016016.70
GR 825.916326.30  825.6016589.90  826.5016727.40  822.9016757.10  824.5016795.50
GR 829.316836.20  824.3016852.30  824.4017113.10  824.3017335.40  825.8017562.60
GR 823.017797.40  823.4018045.60  827.0018222.40  827.2018451.10  827.9018677.60
GR 827.018699.30  832.9018733.20  825.6018767.60  825.1018994.30  825.7019208.30
GR 829.519272.40  826.6019315.40  829.5019327.40  818.4019334.10  820.0019634.60
GR 821.519871.10  821.3020081.30  819.7020309.90  819.9020364.00  820.8020585.70
GR 821.520738.10  819.3020762.30  820.2020779.60  830.5020796.20  827.9020819.80
GR 828.020893.90  824.6021051.50  830.3021252.70  827.9021524.50  825.8021745.90
GR 825.021937.60  821.2022219.20  814.4022350.70  824.1022531.70  825.5022609.50
GR 823.622876.70  821.5023113.20  824.3023245.80  824.4023500.40  824.3023740.20
GR 825.123988.70  824.2024226.20  821.3024268.80  823.9024322.70  825.4024573.70
GR 825.124805.40  826.5025066.40  826.5025194.60  824.6025224.60  828.6025276.80
GR 823.325291.00  823.0025302.60  817.1025317.70  817.4025330.70  825.6025348.20
GR 822.825392.80  824.9025657.90  823.6025716.70  827.1025840.90  826.9026064.60
GR 827.526281.80  828.6026559.00  832.6026586.60  828.5026589.60  830.3026598.20
GR 828.026640.50  829.8026683.30  830.3026901.10  832.4027161.50  834.4027457.50
GR 835.927765.40  838.2027930.10  836.7027938.60  839.9027987.90  835.0027994.00
GR 835.527996.00
HD180.37       10
HE180.37

NC0.0320   0.137   0.030    0.30    0.30
X1180.47       9619323.5020747.20  530.00  455.00  498.37
XL                      18968.0025046.00
GR 839.014801.70  836.9014808.10  842.4014832.80  837.8014917.80  836.5015151.40
GR 832.815556.00  830.1015781.80  832.3015809.30  829.6015828.90  828.0016088.40
GR 826.716352.40  826.2016557.40  830.6016569.60  830.9016585.90  824.6016619.50
GR 824.516849.80  824.4017105.00  824.3017340.70  824.1017566.70  825.2017919.20
GR 826.818170.80  827.4018396.60  826.3018623.80  826.8018881.10  831.6018902.10
GR 824.918927.10  824.2018952.90  827.8018992.30  826.8019084.80  828.7019115.70
GR 824.119207.80  829.0019265.70  825.6019301.90  827.3019323.50  820.3019339.40
GR 820.219349.30  819.8019649.60  822.6019890.40  822.4020140.30  822.1020378.60
GR 821.020731.70  827.1020736.70  831.3020747.20  828.1020795.70  829.3021080.00
GR 827.921136.40  824.5021171.20  827.5021227.30  828.9021368.00  827.6021446.50
GR 829.421485.50  825.7021810.90  823.9022077.70  823.2022223.70  820.2022479.10
GR 820.622516.30  823.2022743.60  823.7022991.70  823.5023242.70  825.5023528.50
GR 823.723773.40  824.6024089.70  824.6024207.20  821.0024261.00  825.4024526.70
GR 825.324782.00  826.9025032.40  825.4025299.20  828.0025351.30  823.0025381.70
GR 817.225393.70  817.9025408.20  822.4025425.40  824.3025444.70  824.5025663.90
GR 822.625718.90  827.0025851.40  827.4026106.90  828.0026333.30  828.9026499.80
GR 827.826506.00  830.9026535.50  828.1026545.20  830.1026599.70  831.3026933.70
GR 831.426948.60  832.6027330.40  834.7027602.50  835.7027842.60  835.5027856.90
GR 839.127905.30  834.2027912.60  839.4027931.90  840.9028210.20  841.4028487.80
GR 844.528867.30
HD180.47       10
HE180.47
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NC0.0320    0.076    0.030     0.30     0.30
X1180.56       9619276.4020727.00  505.00  490.00  492.85
XL                     18614.0025513.00
GR 839.014713.10  837.6014916.10  836.2015175.70  835.7015280.00  835.7015507.70
GR 834.615710.20  835.5015770.90  833.7015899.60  828.9016074.20  828.0016293.60
GR 825.116519.20  824.4016647.30  819.8016683.60  819.6016713.50  824.7016728.80
GR 824.116745.90  821.7016755.70  825.3016992.60  826.1017227.60  825.0017456.50
GR 825.117552.00  826.5017780.50  827.9018010.70  826.9018231.20  827.1018445.80
GR 825.618550.30  827.9018593.40  825.7018712.60  828.0018949.00  831.1019038.50
GR 826.419244.30  821.6019276.40  825.5019368.30  820.5019378.50  820.8019660.40
GR 823.019901.30  823.6020140.70  823.2020326.90  820.7020331.80  821.0020563.60
GR 821.020713.20  830.5020727.00  830.4020931.40  825.7021157.20  827.8021404.00
GR 828.321627.60  827.3021818.00  825.5022070.30  821.6022382.20  822.0022543.20
GR 823.422779.30  825.3022997.50  825.1023254.20  827.2023539.80  827.6023863.40
GR 826.324061.60  820.2024126.00  826.0024186.90  824.5024391.90  826.6024617.90
GR 827.424875.60  826.1025084.10  825.9025306.30  824.2025336.40  826.0025353.60
GR 824.925383.90  826.5025398.30  824.0025430.30  818.8025440.50  819.0025454.00
GR 827.325474.00  824.6025494.10  825.9025763.50  828.4025891.50  827.8026116.40
GR 829.226319.60  828.6026375.20  830.0026393.50  828.2026402.70  830.3026412.70
GR 830.226454.90  830.7026661.40  831.0026689.20  832.8026990.00  833.1027030.10
GR 834.927269.70  835.0027482.20  836.3027720.50  834.7027752.00  838.3027762.30
GR 837.627804.30  834.9027810.30  841.0027824.20  837.7027837.80  839.7028130.90
GR 840.728265.30
HD180.56       10
HE180.56

NC0.0320    0.070    0.030     0.30     0.30
X1180.65       9819306.0020622.20  465.00  485.00  483.21
XL                     18165.0025913.00
GR 840.715062.70  837.3015096.40  836.9015245.90  835.1015306.00  836.0015509.10
GR 834.315538.20  835.6015631.70  833.8015645.80  834.9015835.40  831.0015852.20
GR 832.116042.40  828.7016059.80  828.1016192.80  829.7016244.60  825.5016264.10
GR 827.016469.30  820.6016550.90  825.7016561.40  822.4016587.00  824.7016852.60
GR 825.317087.90  826.0017288.30  826.4017572.30  827.5017779.40  827.7018020.80
GR 826.918265.20  825.2018407.50  828.8018451.90  828.7018665.90  829.2018738.00
GR 831.018751.20  825.2018789.20  830.0018985.10  822.7019180.60  823.5019238.70
GR 825.219276.40  826.6019306.00  824.0019334.30  820.9019346.70  821.3019665.30
GR 822.519871.90  824.3020089.90  824.1020210.20  821.4020218.00  821.6020507.40
GR 821.320603.20  829.5020622.20  829.3620727.00  829.2020850.30  825.6021083.30
GR 830.321143.00  828.5021342.50  829.8021408.90  829.7021592.50  826.3021798.00
GR 825.122060.20  823.2022222.10  826.0022613.40  825.2022955.20  824.8023009.80
GR 819.823331.80  828.8023623.00  828.4023736.10  822.0023838.90  821.3023878.00
GR 827.223928.70  826.8024130.90  828.4024251.00  822.3024290.00  827.4024320.10
GR 827.524534.80  827.6024763.80  827.9024981.20  824.7025186.70  824.0025398.40
GR 819.025414.40  819.3025425.60  825.6025438.00  824.3025480.80  826.8025788.90
GR 828.826060.10  829.3026262.50  829.0026518.10  829.3026566.50  831.3026814.40
GR 832.326932.60  833.5027137.70  835.3027394.70  836.7027604.20  834.9027614.60
GR 839.427666.30  835.6027673.30  839.5027685.80  837.0027699.70  838.3027753.10
GR 839.927989.30  840.8028177.50  841.6028413.50
HD180.65       10
HE180.65

NC0.0320    0.067    0.030     0.30     0.30
X1180.75       9619445.1020601.70  710.00  590.00  508.13
XL                     17747.0026761.00
GR 840.015321.80  835.4015493.00  836.3015534.00  833.5015557.40  832.4015736.50
GR 834.515752.50  831.7015769.00  832.8015963.00  830.2015974.00  830.0016164.40
GR 824.916192.60  826.0016431.40  826.0016618.10  821.1016669.00  827.1016674.00
GR 827.916688.30  822.8016702.80  823.6016956.30  826.6017118.50  826.9017415.10
GR 827.617726.20  827.6017949.40  828.0018186.20  828.1018289.60  825.0018368.60
GR 830.418429.00  827.0018493.50  829.4018766.80  827.1018910.00  831.1019011.20
GR 822.519055.30  823.1019160.30  825.6019196.20  824.7019277.70  826.5019322.90
GR 823.419339.90  826.5019361.90  826.2019445.10  821.4019460.50  822.4019920.90
GR 822.920136.60  823.1020385.20  822.9020579.40  832.9020601.70  828.7020673.20
GR 826.820820.60  828.1020867.10  824.7020893.50  826.6021194.00  828.0021325.00
GR 825.821707.20  824.9021923.50  824.1022055.90  828.7022236.10  828.7022386.90
GR 825.522611.30  825.4022633.40  825.3022926.20  825.3022942.60  820.2023279.50
GR 822.223497.00  821.5023719.90  821.0023853.70  823.6023917.10  822.3023958.10
GR 830.024054.00  829.1024435.80  828.5024524.10  826.3024557.50  829.3024584.50
GR 827.724603.90  829.1024937.70  826.5025248.30  824.3025290.80  826.6025394.40
GR 824.425411.60  826.1025429.40  821.0025435.40  820.5025450.70  827.2025470.00
GR 826.625769.70  826.8025797.50  827.9026021.90  828.3026111.60  828.5026385.70
GR 830.126621.90  831.3026769.10  832.2027066.40  833.6027335.00  834.4027552.90
GR 837.627640.80  837.8027888.40  838.4028155.70  840.0028407.10  840.9028688.90
GR 842.028779.30
HD180.75       10
HE180.75

NC0.0320    0.062    0.030     0.30     0.30
X1180.85       9619511.0020727.30  535.00  545.00  524.58
XL                     17316.0027083.00
GR 843.415715.80  837.1015838.00  830.9015849.70  835.1015876.10  835.6015894.90
GR 831.015917.50  831.3015928.10  827.8015972.10  828.3016187.50  826.2016400.00
GR 826.116643.30  829.7016877.20  829.7016907.50  824.0016933.50  824.8016978.40
GR 825.717179.50  827.2017392.80  827.1017596.90  827.6017811.90  828.0018092.30
GR 829.218251.30  826.3018326.90  830.7018461.40  830.0018714.90  830.5018770.00
GR 833.318801.10  833.0018846.60  824.6018881.80  823.3018966.00  825.8019166.10
GR 827.219343.10  826.9019436.60  824.7019461.10  827.4019511.00  827.1019538.40
GR 821.819548.20  822.4019754.80  822.5019998.90  822.7020081.20  823.1020320.60
GR 823.020634.60  823.0020716.50  834.2020727.30  830.2020763.10  830.3020957.20
GR 829.221166.00  826.8021386.00  827.5021474.80  825.8021710.20  825.5021811.10
GR 825.822095.50  825.3022370.00  825.9022682.90  826.5022871.10  826.4023203.90
GR 826.623477.70  825.8023691.10  826.1023983.70  826.9024098.20  825.6024325.80
GR 826.124510.90  829.8024577.80  829.7024776.60  828.6024979.10  829.7025172.60
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GR 828.825377.70  827.6025396.30  828.9025402.00  825.0025410.00  825.3025438.20
GR 820.025448.70  821.5025475.10  827.0025502.70  826.0025587.20  826.5025782.30
GR 826.525793.60  827.0026022.60  827.0026028.60  827.4026274.70  827.4026400.60
GR 830.326448.40  829.1026506.10  830.9026753.60  831.1026780.10  832.3027108.70
GR 832.427135.40  833.6027364.00  833.6027543.00  836.0027724.60  837.6027925.50
GR 838.227981.20  839.3028200.60  839.3028243.40  840.8028497.10  841.5028750.40
GR 842.628890.20
HD180.85       10
HE180.85

NC0.0320   0.070   0.030    0.30    0.30
X1180.94       9619429.9020726.20  540.00  405.00  479.73
XL                     16787.0027000.00
GR 840.015919.60  842.8015956.10  840.4016010.70  830.1016063.20  834.8016091.10
GR 833.016102.10  834.2016126.40  830.3016137.20  826.6016351.30  825.5016540.60
GR 828.016760.00  829.4016904.10  827.4017070.80  825.3017117.80  827.6017367.60
GR 827.717427.60  827.7017652.30  828.5017881.80  828.9017961.00  828.7018179.30
GR 829.018339.20  826.7018515.60  824.7018644.10  822.2018680.50  824.1018800.60
GR 822.918838.60  826.5018883.90  824.4019014.10  821.0019029.10  825.4019080.60
GR 826.719156.10  821.4019167.40  826.6019252.30  825.8019429.90  823.2019516.30
GR 825.319524.90  825.2019539.70  821.6019557.50  823.1020014.70  823.7020438.90
GR 823.720623.80  823.7020716.10  829.8020726.20  822.8020824.40  821.0020831.70
GR 826.020997.60  827.5021012.90  826.4021022.00  828.6021188.90  828.9021362.70
GR 828.321528.70  828.8021711.80  826.0021905.30  827.9022068.20  828.3022259.50
GR 827.122437.80  827.2022672.00  826.7022844.00  826.5023053.00  825.6023230.80
GR 825.523413.20  826.9023575.30  826.0023754.10  826.2023950.20  825.8024114.10
GR 826.424323.90  828.6024499.70  825.3024578.90  826.2024646.60  824.3024701.50
GR 830.524780.20  829.1024810.40  831.1024992.10  829.3025183.80  828.6025297.80
GR 830.825311.90  827.2025326.20  827.7025340.40  820.7025346.90  819.8025360.90
GR 828.725378.00  827.3025659.20  828.8025904.50  829.4026126.00  829.9026289.70
GR 830.126462.10  832.6026703.10  833.5027015.80  834.5027253.40  834.8027417.30
GR 837.927522.10  836.2027551.40  837.8027804.30  839.1028024.20  840.0028197.10
GR 841.528495.20
HD180.94       10
HE180.94

NC0.0320   0.070   0.030    0.10    0.30
X1180.99       9619476.4020732.30  250.00  230.00  272.51
XL                     16480.0026950.00
GR 845.916004.80  840.5016057.70  835.3016074.20  829.2016116.70  835.0016137.00
GR 833.616183.00  831.0016195.00  827.9016240.20  826.2016384.00  828.6016581.90
GR 829.116815.80  828.7017038.10  828.7017231.00  826.0017288.80  827.5017498.50
GR 826.217774.90  829.1018001.90  829.9018291.00  829.0018331.40  822.7018387.90
GR 824.618622.00  822.9018711.70  827.6018797.00  824.2018856.20  825.5018966.70
GR 821.618992.00  824.8019083.90  826.2019286.40  825.3019447.50  826.7019476.40
GR 820.719521.90  822.8019588.70  821.0019593.20  822.4020050.20  822.8020160.30
GR 824.120474.90  823.8020670.90  824.0020713.40  835.8020732.30  819.6020784.20
GR 822.820911.00  829.2020973.20  829.0021223.10  831.4021329.90  828.0021551.60
GR 825.821845.70  824.3021938.60  821.3022015.40  824.1022043.90  824.7022136.90
GR 825.722352.10  825.6022428.30  826.8022669.30  827.7022753.50  827.5023025.00
GR 827.323131.40  826.9023433.50  826.8023464.60  829.1023781.50  829.1023814.30
GR 830.724098.30  830.8024112.70  827.6024338.90  829.2024522.20  826.6024819.40
GR 826.324872.80  832.0024948.70  831.2025074.30  825.3025129.00  826.3025165.40
GR 828.525171.50  831.2025231.10  827.1025251.00  827.1025267.00  819.8025269.90
GR 821.825287.60  826.7025301.70  828.1025534.40  827.6025768.50  828.3026038.60
GR 830.626229.10  831.5026529.40  832.5026804.50  833.9027109.90  834.4027340.60
GR 835.227387.30  838.0027448.90  837.4027694.60  839.2027967.90  839.2028075.70
GR 840.828287.90  841.4028529.60  844.0028724.20  846.3028759.80  845.0028773.60
GR 846.128856.90
HD180.99       10
HE180.99

NC0.0320   0.071   0.030    0.10    0.30
X1181.04       9619404.1020956.90  250.00  230.00  229.74
XL                     16200.0026860.00
GR 837.815505.50  841.7015530.00  842.9015586.10  840.4015613.60  834.3015659.60
GR 837.115735.70  832.7015835.50  835.2015868.30  832.7015973.50  835.2016055.70
GR 831.216092.80  838.6016114.70  832.9016159.60  828.2016247.40  827.7016473.90
GR 829.416841.20  829.3017249.90  830.5017470.00  826.4017508.80  825.8017565.30
GR 830.517640.50  828.7017897.10  830.1017989.60  822.6018055.70  825.1018295.80
GR 824.518517.30  825.2018669.90  822.3018683.00  826.2018774.90  825.0018846.90
GR 822.118887.20  822.1018918.90  826.1018949.80  825.7018961.80  820.8018994.10
GR 826.319099.90  823.2019123.00  826.3019155.30  826.8019329.20  825.0019404.10
GR 820.719457.50  823.7019614.80  821.0019619.70  821.1019631.90  821.9019865.80
GR 822.319947.60  824.2020518.20  824.3020616.20  820.6020745.50  825.0020757.20
GR 823.520790.20  824.2020864.20  831.0020956.90  829.9021193.80  828.2021418.10
GR 828.221653.10  824.9021817.10  825.0022063.20  827.6022323.00  829.5022656.40
GR 829.722793.00  830.0023017.30  829.9023135.10  829.8023387.90  829.1023614.00
GR 829.123672.00  829.0023967.90  829.0024073.50  829.4024362.80  828.6024647.30
GR 826.524702.10  829.1024935.40  830.2025035.60  824.5025063.10  826.5025098.30
GR 831.025108.70  827.3025191.30  821.3025201.90  821.1025213.30  824.9025230.00
GR 828.325420.30  827.9025618.70  829.3025949.60  829.7026192.00  830.7026427.90
GR 832.126670.50  832.4026721.40  833.5027006.70  833.8027230.70  835.2027322.80
GR 837.727384.60  837.7027630.40  839.0027866.70  840.3028132.00  842.2028466.60
GR 843.428650.00
HD181.04       10
HE181.04

NC0.0320   0.073   0.030    0.10    0.30
X1181.13       9319570.4020901.20  595.00  560.00  496.11
XL                     16162.0026800.00
GR 848.615825.20  845.0015848.80  840.6015858.30  834.4015904.70  835.3016150.50
GR 836.216162.00  829.1016176.90  832.0016303.30  828.7016546.70  829.9016775.30
GR 829.816965.90  829.6017151.00  829.8017355.90  829.9017531.20  829.9017649.50
GR 822.317683.60  824.9017722.70  823.8017851.90  826.2017888.00  824.1018025.80
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GR 824.318229.10  824.8018416.20  824.0018615.80  824.1018670.30  826.4018716.30
GR 824.418791.80  822.1018814.80  821.7018860.80  825.6018909.90  826.9019100.00
GR 824.719162.40  826.5019284.40  822.9019318.50  824.6019359.40  824.1019570.40
GR 821.819573.20  821.9019614.70  822.0019836.10  822.5019944.50  823.3020195.50
GR 823.420235.40  822.3020506.10  822.1020654.60  822.1020887.10  830.6020901.20
GR 829.921217.70  828.9021407.40  828.3021664.80  828.0021828.90  826.1022008.20
GR 826.622188.20  827.1022358.40  827.2022368.00  827.9022617.50  827.9022637.00
GR 828.023064.30  827.9023293.40  827.8023335.90  827.7023583.10  826.9023758.70
GR 828.223977.40  829.1024146.90  829.3024482.90  829.4024710.50  829.6024921.60
GR 824.324957.30  830.5025001.00  828.3025130.20  821.4025139.60  820.8025151.00
GR 827.325187.00  828.5025485.70  828.9025643.60  829.7025861.50  829.9026143.90
GR 830.326209.60  831.9026443.80  832.1026520.50  833.7026719.80  834.4026979.40
GR 835.227157.50  837.5027427.30  837.9027492.00  839.8027667.60  840.2027730.20
GR 840.327938.20  840.9028024.10  841.8028265.40  842.4028444.90  843.6028565.30
GR 846.028666.60  846.9028838.50  847.0028882.90
HD181.13      10
HE181.13

NC0.0320   0.064   0.030    0.10    0.30
X1181.23      9419601.5020999.80  425.00  200.00  513.06
XL                      16197.90
GR 848.815632.10  843.6015653.20  842.5015665.70  840.6015666.50  835.6015679.50
GR 834.915719.40  841.4015765.60  836.8015823.00  841.9015886.50  834.0015965.50
GR 837.116197.90  836.3016213.40  832.4016218.50  833.8016250.50  829.8016293.80
GR 832.916332.60  830.2016394.90  830.1016622.30  830.4016872.20  830.4016882.30
GR 830.717276.30  830.8017522.20  831.0017671.90  823.1017707.50  825.7017913.20
GR 825.118131.70  825.6018340.40  827.0018482.40  822.2018513.80  823.7018731.40
GR 824.718938.00  825.0019115.90  826.5019160.70  824.8019310.00  826.4019475.80
GR 823.919492.10  825.4019601.50  822.6019605.50  822.8019891.00  824.3020113.20
GR 824.720259.70  823.2020295.40  823.3020566.10  824.1020775.50  824.5020990.20
GR 831.820999.80  831.1021260.50  828.5021575.80  830.8021868.70  830.6021915.40
GR 829.622114.40  830.8022366.10  830.7022582.20  830.1022813.90  828.8023030.20
GR 828.123269.00  827.2023513.00  829.4023742.90  830.3023950.60  830.7024283.70
GR 830.424549.70  829.9024772.30  826.4024811.50  825.9024848.10  824.2024855.20
GR 829.924899.00  830.4024930.80  826.9024990.10  821.0025004.20  820.1025019.40
GR 828.525046.00  827.9025259.80  828.4025327.60  828.3025567.30  830.1025834.10
GR 830.526036.70  831.1026280.20  832.7026508.50  833.4026601.10  834.5026857.30
GR 835.727093.80  838.6027461.80  839.8027515.50  842.6027775.10  842.6027816.20
GR 841.928147.80  842.0028194.30  843.2028417.30  844.6028459.60  843.1028466.10
GR 845.728472.30  844.3028559.90  846.8028790.30  846.2028938.20
HD181.23      10
HE181.23

NC0.0370   0.057   0.030    0.10    0.30
X1181.32      9319503.9021259.90  495.00  550.00  493.37
XL                      16231.80
GR 844.815808.10  837.5015935.10  833.8015963.30  836.1016047.60  836.6016231.80
GR 834.716268.40  836.1016343.20  834.7016573.70  833.8016846.30  835.5016883.10
GR 836.716915.30  831.0017093.10  831.3017359.80  832.1017577.60  830.8017785.20
GR 831.417847.00  828.3018032.40  826.8018245.80  824.9018364.80  821.4018402.50
GR 821.318481.60  824.4018509.50  822.4018557.90  824.0018728.30  827.1018893.30
GR 830.718924.00  831.2019093.90  830.3019225.20  824.9019263.80  827.0019446.60
GR 825.519503.90  822.8019505.20  822.8019515.40  824.7019949.40  825.6020119.90
GR 825.020328.20  826.2020521.00  824.5020586.10  825.9020896.70  826.4021084.80
GR 826.621245.00  832.3021259.90  830.2021469.70  830.9021670.70  831.1021868.40
GR 831.222036.10  831.8022238.40  831.8022476.50  831.9022696.20  827.5022880.40
GR 829.023049.50  828.1023247.40  829.3023559.50  829.8023701.00  829.9023874.00
GR 830.324075.30  830.7024315.10  830.7024560.30  827.0024692.50  831.9024720.30
GR 825.824752.90  821.8024760.20  821.2024775.50  830.8024827.00  827.8024961.70
GR 828.725138.60  828.8025285.10  828.5025536.40  829.7025711.30  831.7025876.00
GR 830.425883.10  832.9025908.30  830.9025938.90  832.6026195.20  833.1026357.60
GR 834.326538.40  837.1026709.20  836.7026882.60  835.8026917.90  839.1026932.40
GR 836.426974.40  837.9026986.10  837.0027057.60  838.4027220.50  839.3027484.50
GR 840.127670.60  841.2027985.80  842.1028224.40  841.9028266.10  846.6028299.90
GR 845.328505.50  846.0028728.80  846.5028896.40
HD181.32      10
HE181.32

NC0.0370   0.041   0.030    0.10    0.30
X1181.41      9619324.3021376.00  495.00  435.00  497.47
XL                          26130.00
GR 844.016069.40  837.9016126.40  838.6016149.40  836.3016166.70  835.0016257.50
GR 832.816297.50  834.7016343.70  831.0016401.10  832.1016595.00  831.8016821.00
GR 832.517083.30  832.4017123.10  832.3017324.00  832.2017515.20  829.3017626.40
GR 830.617809.50  830.9017978.20  821.3018003.40  821.3018061.40  827.6018114.50
GR 828.418154.20  825.6018243.70  827.7018368.80  824.4018405.50  825.8018484.60
GR 823.218511.60  823.9018601.20  826.0018635.40  824.6018699.30  830.2018879.90
GR 828.418966.80  831.8019000.60  829.3019056.00  832.6019229.40  826.6019262.60
GR 830.419324.30  825.2019351.70  825.3019441.10  823.4019444.70  825.4019881.50
GR 825.520076.90  826.9020325.90  826.0020618.80  825.6020714.10  826.5021095.00
GR 827.121368.10  831.6021376.00  829.7021450.60  832.0021705.90  832.4021806.40
GR 833.722230.50  833.7022275.00  829.3022590.70  829.4022628.70  833.7022954.70
GR 833.523010.80  833.3023387.70  833.2023410.60  833.1023914.60  833.0023928.90
GR 829.524138.60  829.5024142.30  831.6024324.50  834.1024335.30  834.7024434.10
GR 832.224470.60  834.6024500.80  828.0024533.20  827.7024542.60  822.6024558.30
GR 822.624572.30  831.1024637.10  827.9024710.40  829.7024965.80  829.7024988.60
GR 828.825390.80  829.0025455.50  829.4025657.10  831.5025714.80  829.6025773.90
GR 830.425996.20  831.0026072.80  831.8026414.80  834.0026653.20  837.2026786.00
GR 835.026788.90  837.5026806.10  837.2027043.80  838.4027212.00  839.3027500.00
GR 839.627616.30  840.5027841.50  841.2028040.20  842.5028081.00  846.4028113.50
GR 846.128378.00
HD181.41      10
HE181.41

NC0.0370   0.070   0.030    0.10    0.30
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X1181.51       9619432.1021433.00  630.00  435.00  521.13
XL                        16723.4025740.00
GR 841.016541.80  842.5016580.70  835.7016592.90  834.3016623.60  835.7016723.40
GR 831.816758.50  833.6016805.00  833.5017015.00  834.3017207.40  834.5017266.30
GR 834.317415.80  834.5017584.50  834.5017599.00  835.4017734.30  835.1017858.60
GR 835.417945.00  832.9018051.80  824.6018090.70  824.1018211.20  820.9018302.50
GR 830.118359.30  827.9018475.00  824.8018524.80  826.3018645.80  826.1018780.50
GR 827.018923.10  829.7019050.70  830.9019187.70  828.8019312.40  830.8019432.10
GR 825.719521.10  824.1019528.50  824.7019795.40  824.9019928.60  825.2020055.70
GR 825.320173.00  826.6020288.90  825.8020308.60  826.2020435.20  826.2020553.00
GR 825.720668.90  825.6020721.40  826.2020945.70  827.0021149.00  828.0021423.30
GR 831.621433.00  829.8021574.90  831.0021775.20  831.2021924.70  830.9022069.60
GR 831.122259.30  830.8022567.50  830.6022766.10  831.9022905.40  831.9023095.70
GR 832.223260.80  831.5023565.60  830.8023745.30  830.2023920.10  831.2024066.90
GR 832.424156.00  836.8024212.50  837.7024269.10  835.0024322.90  834.8024377.20
GR 831.924394.60  831.7024415.70  826.2024456.90  822.4024476.00  827.2024491.70
GR 833.424625.00  832.4024743.90  832.0024890.10  832.1024923.00  831.5025110.80
GR 831.425163.80  831.2025462.20  831.0025588.50  831.8025744.30  832.6025952.20
GR 833.126077.90  833.9026300.50  833.9026459.30  834.6026608.10  838.0026697.70
GR 834.426707.20  838.1026722.80  837.7026800.50  838.7026991.70  838.9027067.90
GR 840.327389.00  840.4027439.40  841.1027735.20  842.0027872.70  840.3027955.20
GR 842.927999.00
HD181.51       10
HE181.51

NC0.0370   0.073   0.030    0.10    0.30
X1181.62       9619385.7021375.00  680.00  380.00  551.52
XL                            25780.00
GR 842.416983.00  841.9016995.30  836.7017020.30  837.7017087.70  834.5017111.40
GR 834.417130.10  834.1017317.80  835.0017522.90  834.8017701.50  835.2017939.50
GR 834.218118.40  828.4018155.70  822.8018176.10  823.6018250.20  828.3018398.40
GR 824.318424.90  826.1018538.50  828.2018555.80  828.8018600.00  825.5018691.20
GR 826.218793.70  824.5018839.50  826.8019009.40  828.6019173.20  830.7019385.70
GR 829.519549.80  826.1019692.90  824.1019699.60  825.6019998.80  826.1020103.50
GR 826.920291.30  826.8020470.80  828.4020650.10  826.3020778.40  827.1021004.60
GR 827.721196.60  828.4021368.60  832.5021375.00  830.3021445.30  830.5021633.30
GR 830.621711.00  830.5021992.50  830.6022041.90  832.2022427.40  831.6022503.20
GR 832.122782.70  832.1022994.00  832.3023179.80  831.4023369.80  830.0023538.10
GR 831.523795.90  835.5024036.40  835.4024223.80  835.0024232.60  839.0024245.10
GR 830.124262.20  830.1024269.30  824.1024281.00  825.6024312.20  831.9024357.70
GR 832.124488.00  832.6024648.60  833.6024810.40  833.4024971.50  832.9025051.00
GR 834.125065.30  831.9025112.50  831.6025185.50  832.3025353.40  832.6025385.40
GR 833.025597.60  832.9025623.90  832.8025941.40  832.8025946.70  832.6026177.90
GR 832.826223.20  830.9026237.90  832.4026467.90  835.0026492.50  833.0026500.80
GR 836.526510.70  837.7026535.40  828.5026540.20  827.7026550.60  838.1026569.50
GR 836.026647.90  837.2026820.10  837.4026851.40  838.5027121.30  838.8027193.40
GR 840.127417.70  840.8027553.10  841.4027751.20  843.3027926.70  845.0028199.30
GR 846.728443.80
HD181.62       10
HE181.62

NC0.0370   0.060   0.030    0.10    0.30
X1181.74       9719481.5021228.10  890.00  375.00  625.63
XL                        17895.6026120.00
GR 849.017284.50  843.8017325.10  843.8017341.80  836.8017397.40  839.8017408.50
GR 839.617417.60  840.1017557.80  838.1017719.30  837.9017855.80  840.0017895.60
GR 839.518030.40  837.2018119.00  836.8618120.49  826.2018166.80  826.7018334.20
GR 830.318364.10  831.9018438.50  827.9018546.50  829.3018650.40  833.8018784.80
GR 827.418929.90  825.6018990.40  829.5019010.20  830.4019144.40  828.7019222.70
GR 830.819282.00  827.7019344.50  829.3019481.50  827.3019541.90  828.7019643.90
GR 826.519667.80  827.0019710.60  824.7019718.40  825.1019899.30  826.1020213.10
GR 828.420381.90  828.3020516.80  826.8020692.80  826.7020828.60  828.0021098.60
GR 828.821215.50  833.0021228.10  830.7021386.90  829.6021532.30  829.4021578.30
GR 829.121756.00  829.5021800.70  829.8022212.70  829.9022280.60  831.5022931.20
GR 832.123186.00  832.5023236.60  833.2023396.10  834.0023633.40  834.4023791.80
GR 835.223927.60  835.4024033.60  830.1024089.70  824.5024099.40  828.3024145.20
GR 831.524292.10  832.7024427.60  832.8024612.50  832.5024770.80  831.7024921.30
GR 832.425061.00  832.8025256.60  833.0025306.00  832.4025577.40  832.1025614.70
GR 832.225800.30  832.3025866.30  831.2026055.20  832.1026211.20  832.2026351.10
GR 835.526376.00  833.1026381.30  837.0026415.50  833.4026420.00  827.8026424.00
GR 828.226432.60  837.9026452.20  835.0026515.10  836.2026539.70  837.2026758.80
GR 838.726947.90  838.9026959.90  840.4027239.40  841.4027441.30  842.2027545.20
GR 843.027679.40  843.3027757.90  844.5028028.60  845.7028146.00  846.5028327.20
GR 847.228465.10  848.9028681.00
HD181.74       10
HE181.74

NC0.0370   0.045   0.030    0.10    0.30
X1181.82       9719448.0020993.00  400.00  390.00  463.36
XL                            26338.10
GR 845.917708.40  846.9017735.60  844.1017778.80  844.2017841.40  845.8017842.50
GR 841.518004.80  840.3018071.80  840.4018216.10  840.5018262.20  837.1918275.59
GR 829.518306.70  826.0018349.30  828.9018404.70  829.6018557.60  830.1018707.10
GR 829.318784.70  832.0018839.00  829.5018992.10  831.6019118.60  830.2019245.50
GR 827.419261.20  827.1019281.60  829.4019302.30  828.8019448.00  828.3019594.20
GR 825.519613.60  825.6019832.60  824.9020199.90  826.3020305.20  826.4020515.30
GR 826.020658.20  826.3020812.20  826.4020983.50  832.5020993.00  833.4021142.70
GR 832.421233.90  832.6021478.80  832.9021547.90  831.7021740.70  831.6021759.00
GR 832.221915.00  833.3022214.20  833.2022351.70  832.6022666.40  833.0022846.30
GR 832.723032.80  833.1023228.60  835.3023502.10  835.4023674.80  836.1023715.70
GR 831.723750.80  830.4023789.30  826.9023796.70  828.4023811.00  831.4023819.80
GR 831.223830.80  824.1023844.20  826.1023870.70  830.2023898.30  831.5024104.50
GR 830.624267.30  831.6024570.60  831.4024759.10  832.5024819.00  832.0024860.50
GR 832.825024.70  833.0025145.80  833.1025372.70  832.6025510.10  831.7025665.30
GR 831.425832.10  831.9025974.30  832.7026156.70  832.3026194.30  835.2026224.60
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GR 832.926229.20  835.8026242.60  836.0026261.80  827.8026271.10  828.3026279.20
GR 836.826298.30  837.6026338.10  834.8026361.80  835.5026382.90  836.3026560.20
GR 836.726628.90  837.9026928.60  838.3026995.30  839.7027181.60  839.9027350.60
GR 840.627500.90  844.2027564.40  844.5027755.60  845.4027937.20  845.8028056.40
GR 848.028256.50  848.8028291.00
HD181.82      10
HE181.82

NC0.0370   0.052   0.030    0.10    0.30
X1181.90      9719400.3021080.00  270.00  590.00  414.11
XL                     18440.7026193.10
GR 845.617817.20  848.6017902.80  845.0017917.60  838.0017934.10  831.7018071.90
GR 840.218101.60  838.4018146.50  838.9018281.10  838.5018368.10  843.5018440.70
GR 840.918589.30  837.5518610.12  827.8018670.60  826.2018729.60  828.9018750.10
GR 827.918906.20  833.0018955.90  832.6019108.90  831.8019281.50  832.8019334.90
GR 829.719400.30  828.6019544.50  829.9019576.20  829.2019592.30  826.2019609.90
GR 826.219631.10  826.4020584.70  826.5020802.50  827.2020816.80  830.4020837.80
GR 829.821080.00  829.8021150.20  826.2021170.60  825.7021267.60  833.4021296.90
GR 830.821330.90  831.4021441.40  831.2021688.50  830.9021745.80  830.8021905.40
GR 830.821970.50  831.7022314.30  831.9022553.50  832.0022699.40  832.9022846.70
GR 835.422992.50  836.1023032.20  833.9023189.60  834.7023358.60  836.3023477.20
GR 832.623627.80  837.5023665.00  835.6023751.60  830.8023802.20  826.0023921.50
GR 823.723933.60  825.0023946.00  832.5023963.20  831.5024111.00  836.0024154.00
GR 837.124298.90  833.6024463.50  833.3024618.70  831.5024861.40  832.3024990.70
GR 832.625316.70  832.6025364.30  833.1025532.90  833.0025681.40  832.1025837.70
GR 832.425873.10  831.0025883.30  831.7026094.60  832.3026108.60  835.7026117.60
GR 834.526124.70  836.5026153.00  828.4026166.20  829.0026174.10  837.9026193.10
GR 837.026234.90  834.2026255.90  835.8026355.00  836.8026498.60  837.5026657.80
GR 837.826810.50  838.5027016.30  839.3027256.50  840.0027400.00  843.6027458.40
GR 844.527645.90  844.7027672.40  846.5027856.40  846.5027872.90  846.7028097.90
GR 847.128143.40  848.5028472.70
HD181.90      10
HE181.90

NC0.0370   0.043   0.030    0.10    0.30
X1181.99      9719457.0020927.30  370.00  390.00  443.58
XL                            26140.00
GR 842.318503.30  841.5018647.50  841.6018752.40  854.2018809.70  838.0218843.32
GR 829.918860.20  826.5018883.20  826.7018984.80  829.4019040.00  829.0019159.10
GR 831.819192.10  830.6019215.10  828.9019219.90  831.2019360.20  831.8019457.00
GR 829.019511.10  829.3019587.70  826.2019604.70  826.5019912.60  826.4020021.50
GR 826.620271.90  826.7020502.40  826.7020721.70  831.0020765.10  830.2020927.30
GR 828.721123.00  828.1021205.90  830.9021239.20  830.9021385.30  830.5021419.40
GR 825.721455.90  825.2021564.40  831.5021591.00  829.2021673.40  830.8021844.70
GR 831.522004.10  833.6022293.50  834.3022489.70  833.1022684.70  833.2022872.50
GR 833.422897.10  835.2023108.40  834.8023307.20  834.3023371.70  835.6023499.20
GR 835.423557.80  833.6023685.10  833.8023753.50  830.0023791.50  826.8023857.00
GR 823.223871.70  824.7023885.90  832.6023917.10  832.0023996.30  831.7024250.30
GR 832.324316.90  832.4024477.90  832.6024611.30  832.6024669.20  830.7024689.10
GR 831.624711.50  832.4024915.90  832.8024978.20  833.9025210.90  834.0025224.20
GR 832.625538.00  832.5025709.90  832.8025818.80  831.1025831.00  832.1026051.30
GR 835.426063.90  833.9026072.30  836.5026085.70  835.9026098.70  830.2026110.70
GR 830.426120.30  836.9026136.40  837.1026176.30  834.7026204.90  835.6026340.30
GR 836.526524.10  837.3026736.80  837.8026814.00  838.7026996.40  840.5027151.00
GR 840.327348.60  842.6027400.00  844.2027404.50  842.6027476.80  844.2027617.20
GR 844.427631.30  845.0027839.30  845.2027874.90  845.7028051.90  846.3028226.50
GR 846.628268.90  848.3028480.20
HD181.99      10
HE181.99

NC0.0370   0.034   0.030    0.10    0.30
X1182.08      9619482.0020816.60  505.00  485.00  509.10
XL                            25800.00
GR 848.418533.40  843.3018557.20  840.2018605.80  839.8018834.90  838.7018901.50
GR 834.218951.30  838.6019000.40  839.0019030.00  834.0019079.70  827.1019107.00
GR 832.619350.70  831.6019436.50  829.3019456.70  830.9019482.00  828.1019544.30
GR 830.219564.60  826.3019582.00  826.6019806.90  827.0020040.30  827.2020232.70
GR 827.420402.20  827.5020623.80  831.6020645.70  829.9020816.60  830.7021017.30
GR 831.121090.10  828.7021179.90  829.0021358.00  828.4021542.90  828.3021591.90
GR 825.721617.60  825.1021732.60  827.2021747.90  826.1021814.00  829.5021861.40
GR 829.821893.70  825.2021921.10  825.1022018.10  832.6022050.30  830.4022080.80
GR 835.522144.00  834.2022371.60  833.8022385.20  835.2022593.00  836.2022790.90
GR 837.722808.10  845.6022851.50  832.0022870.00  831.0023113.10  828.0023164.00
GR 829.523356.30  831.4023438.90  831.5023638.30  830.2023681.10  826.3023698.60
GR 826.323707.80  830.6023730.20  833.3023875.80  834.4023975.60  832.5024240.40
GR 832.424443.30  833.8024620.80  831.5024680.10  832.4024701.20  832.7024941.40
GR 832.625037.10  832.5025262.60  832.9025478.90  832.2025726.80  831.8025745.50
GR 832.625782.40  831.4025790.60  833.5025957.10  832.6026013.20  834.0026038.10
GR 836.026046.20  836.0026062.30  831.1026069.70  832.2026079.70  836.4026091.40
GR 837.526125.40  835.4026187.80  836.0026412.50  836.2026508.20  837.3026788.30
GR 838.426980.70  838.8027098.80  840.2027310.30  841.1027570.90  841.8027768.70
GR 842.527827.90  845.1027856.50  844.0027891.70  846.9028088.50  845.7028287.40
GR 846.628443.40
HD182.08      10
HE182.08

NC0.0370   0.043   0.030    0.10    0.30
X1182.17      9219516.1020874.70  450.00  525.00  471.44
XL                     19270.0025380.00
GR 847.818580.50  844.9018619.40  842.3018630.20  844.1018786.70  839.9018808.60
GR 840.218916.30  838.3018943.00  840.0018972.90  837.7018994.40  839.8019115.80
GR 830.419154.20  828.9019228.80  835.6619270.00  836.3019273.90  831.2019388.50
GR 828.419414.30  830.7019432.40  830.7019516.10  826.4019530.10  827.2019882.50
GR 827.620327.60  827.5020521.20  832.4020555.80  828.9020594.40  835.7020874.70
GR 833.320932.00  835.0020952.40  828.9021013.90  831.6021228.50  827.0021502.20
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GR 826.721554.80  830.3021589.70  829.7021794.10  826.8021878.40  824.3021894.60
GR 825.522044.70  823.2022055.70  831.1022309.90  831.9022378.50  831.0022465.80
GR 834.922570.00  843.3022643.00  847.8022666.20  848.0022692.80  840.0022769.20
GR 838.722808.20  841.2022839.40  838.6022851.90  841.1023033.70  838.8023082.30
GR 840.723104.90  838.6023397.80  841.9023405.40  834.3023425.30  830.6023525.00
GR 831.023629.80  833.2023657.40  832.1023673.00  824.7023687.10  830.4023707.20
GR 833.523985.10  834.2024273.80  830.8024534.60  832.2024788.00  833.7024936.30
GR 831.225090.20  832.8025372.80  833.2025695.30  834.8025971.10  834.5026052.00
GR 829.326056.30  830.4026072.30  836.0026089.70  837.3026483.40  839.1026743.00
GR 838.026933.40  839.2027153.70  840.9027462.30  842.0027735.60  841.4027808.60
GR 843.927847.20  845.6028160.30  847.8028420.10  849.4028449.20  841.3028464.20
GR 841.128482.40  849.7028501.70  847.6028554.80  850.6028632.70  853.8028805.20
GR 851.428827.30  851.8028882.10
HD182.17      10
HE182.17

NC0.0290   0.043   0.030    0.10    0.30
X1182.27      9719493.6020887.60  485.00  550.00  496.27
XL                                24800.00
GR 850.119017.20  847.5019040.80  842.7019060.20  840.6019091.50  840.8019257.50
GR 839.119311.71  837.5019362.60  833.0019407.80  830.9019493.60  827.1019505.40
GR 827.619715.10  828.3019970.00  828.9020202.00  830.2020363.60  831.0020461.40
GR 829.020479.40  828.7020496.90  831.7020527.10  828.2020688.20  832.3020887.60
GR 833.221053.10  832.9021208.20  835.8021305.10  834.8021363.60  829.3021448.20
GR 828.421526.00  831.0021611.90  830.0021840.10  829.3021958.60  826.7022074.70
GR 825.822240.60  824.2022366.80  833.2022406.90  834.1022438.80  831.5022599.80
GR 834.022738.40  836.6022794.30  841.5022826.40  837.5022837.90  837.4022889.20
GR 834.722924.70  838.7022940.20  834.7022947.10  833.1022968.40  832.9023158.30
GR 833.023245.50  834.5023248.70  833.8023265.60  843.0023287.20  831.1023332.10
GR 836.323388.00  831.9023583.70  832.9023644.90  835.9023671.60  834.7023686.00
GR 835.723688.30  830.1023702.10  828.0023704.80  825.9023714.90  832.6023733.40
GR 831.223852.80  836.4024100.30  837.7024197.10  835.5024358.60  834.5024539.40
GR 833.424700.30  832.1024888.40  832.2025067.00  832.8025233.30  832.5025456.00
GR 832.325665.60  831.1025766.30  832.4025942.40  833.9026008.70  829.3026014.60
GR 829.626023.60  834.9026041.80  836.0026281.90  836.3026342.90  836.9026515.30
GR 837.126583.00  838.4026808.40  838.4026811.80  839.0027015.80  840.2027277.70
GR 842.227342.90  841.1027361.80  842.3027529.00  842.9027703.70  842.2028009.80
GR 843.928188.00  849.7028223.10  849.6028241.90  848.6028411.40  848.0028602.20
GR 847.728655.80  850.4028669.60
HD182.27      10
HE182.27

NC0.0290   0.065   0.030    0.10    0.30
X1182.36      9719396.1620923.40  490.00  590.00  493.32
XL                                24230.00
GR 853.119206.80  853.8019249.40  846.2019363.30  843.9019366.70  843.7019382.90
GR 839.619396.16  829.8019427.80  830.7019448.60  826.8019466.50  827.9019695.00
GR 828.619906.90  829.2020073.90  831.3020158.60  828.7020319.90  827.7020421.00
GR 836.420452.90  834.8020520.80  831.4020564.50  830.0020660.00  826.5020672.40
GR 823.820780.70  834.7020923.40  832.8021035.00  833.4021257.10  833.5021434.90
GR 832.721616.80  834.9021681.70  829.8021771.90  833.3021816.30  831.9021987.80
GR 831.122114.30  829.5022141.90  825.4022162.50  828.2022279.60  824.6022393.40
GR 825.122523.00  827.6022539.60  825.7022543.20  823.6022692.10  828.6022784.10
GR 838.522838.70  837.1022849.80  842.1022933.50  847.6022973.40  843.5023000.60
GR 845.823109.30  836.7023139.50  833.6023273.80  835.1023319.00  833.8023368.60
GR 835.323420.50  833.7023596.60  833.5023639.50  830.3023668.60  830.9023683.80
GR 827.123692.10  826.5023702.50  832.5023718.60  831.1023752.50  832.8023795.50
GR 834.123971.20  838.1024037.70  837.4024168.50  838.8024267.90  836.8024454.40
GR 837.224612.70  835.4024825.40  832.5025089.90  832.5025235.90  832.6025409.60
GR 834.025590.00  834.2025823.30  832.7025860.50  834.2025913.20  829.5025923.70
GR 830.525933.70  835.5025947.00  833.5025967.50  835.1026163.10  836.1026531.50
GR 836.326720.60  836.6026769.90  838.0026989.20  838.0027085.10  840.5027205.70
GR 842.327251.90  841.1027414.80  839.8027570.20  842.7027773.00  843.8027910.00
GR 847.227999.80  846.8028170.10  845.4028369.90  847.1028542.70  850.3028576.20
GR 849.128651.60  850.4028669.80
HD182.36      10
HE182.36

NC0.0300   0.043   0.030    0.10    0.30
X1182.45      9619261.6020667.70  490.00  510.00  493.26
XL                                24050.00
GR 850.219224.10  837.6019261.60  827.3019284.10  827.7019451.40  828.1019602.30
GR 829.319935.80  829.4019953.00  831.2019961.30  831.7020089.70  829.6020097.70
GR 831.520223.80  830.2020271.60  831.9020288.90  829.7020307.70  827.4020409.20
GR 834.920461.80  824.5020667.70  821.4020725.80  826.7020884.20  826.5020981.70
GR 823.621061.40  831.6021190.90  832.7021320.00  835.0021394.10  832.8021552.70
GR 832.621702.70  834.9021782.70  828.4021848.00  830.1022003.90  829.5022163.80
GR 826.022213.90  826.3022266.60  828.6022312.00  830.3022386.00  826.9022424.30
GR 829.222450.10  828.2022462.40  829.0022566.80  825.1022586.90  824.9022674.20
GR 827.222691.50  825.7022769.30  827.0022793.00  838.8022858.30  836.3022952.40
GR 834.523116.90  834.3023272.00  834.4023466.80  836.9023622.50  833.3023759.20
GR 828.923771.40  829.5023785.60  833.9023806.00  836.3023997.60  839.0024204.60
GR 839.824361.90  840.0024530.90  841.2024596.60  839.5024810.10  837.8024983.20
GR 837.125144.90  833.5025298.50  834.7025504.70  834.3025672.00  835.8025853.30
GR 830.725859.50  830.2025870.60  835.2025887.70  836.5025903.50  834.4025911.30
GR 835.626125.30  836.3026230.30  836.1026406.00  836.1026498.40  836.7026731.20
GR 837.526937.80  837.6027125.70  838.1027163.20  839.3027168.70  838.1027175.50
GR 839.627199.60  838.1027222.80  840.0027422.70  840.8027503.60  841.5027668.10
GR 843.127913.30  843.2027985.60  844.3028215.70  844.7028429.30  844.5028479.10
GR 847.128525.20  847.1028692.40  848.3028820.50  849.7028826.70  847.8028858.50
GR 849.128950.60
HD182.45      10
HE182.45

NC0.0320   0.043   0.030    0.10    0.30
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X1182.55       9718958.2520623.40  520.00  525.00  507.96
XL                      18812.6023640.00
GR 850.118613.20  838.5018629.50  835.0018647.70  840.4018664.50  846.5018812.60
GR 845.118921.30  840.7218958.25  831.1019039.40  827.3019056.90  827.4019265.60
GR 828.419458.10  829.5019827.40  831.6019970.60  833.0020019.10  831.2020042.00
GR 833.420182.50  830.7020194.50  829.9020338.60  829.9020422.30  834.8020443.40
GR 830.820487.10  828.5020623.40  828.0020786.10  829.2021024.30  831.6021162.40
GR 832.521299.50  832.2021446.70  832.4021466.80  834.4021694.50  835.3021794.60
GR 826.021857.10  831.5021989.40  831.9022178.20  832.5022244.10  828.2022280.40
GR 829.322420.90  826.2022459.80  827.3022616.30  828.7022655.50  825.7022676.10
GR 824.622826.10  822.6022898.30  822.7023005.20  822.7023148.70  826.5023200.70
GR 838.123256.00  836.8023403.70  836.1023534.50  833.3023539.40  831.8023580.80
GR 838.123722.50  839.2023945.00  838.0024154.00  838.5024295.60  838.5024375.90
GR 838.124512.50  838.2024606.20  838.7024760.80  839.8024929.50  836.5025075.20
GR 836.725215.70  835.1025278.20  837.7025466.20  836.3025609.90  837.6025760.20
GR 837.125772.50  835.3025774.20  832.1025784.00  831.3025791.90  836.9025808.60
GR 837.125948.90  836.7026101.20  837.3026177.20  835.1026350.90  836.4026409.00
GR 837.926423.00  834.1026453.30  835.8026602.20  839.6026712.50  847.0026739.10
GR 838.926925.60  838.7027063.10  839.5027222.60  841.8027428.40  842.4027509.30
GR 842.327740.80  842.9027889.00  843.7028152.30  844.1028211.00  845.0028384.20
GR 845.428425.90  843.1028435.30  847.1028494.00  848.0028692.00  848.8028859.20
GR 849.028903.70  849.2028934.50
HD182.55       10
HE182.55

NC0.0300    0.043    0.030     0.10     0.30
X1182.64       9618459.7020453.50  520.00  500.00  498.71
XL                            23640.00
GR 850.018435.40  840.0018459.70  828.6018473.20  828.4018734.00  828.0018960.10
GR 827.619145.70  827.5019304.20  827.6019520.20  830.0019714.70  829.8019881.20
GR 831.620005.60  829.4020059.90  833.0020090.40  831.4020219.10  829.4020240.50
GR 829.620371.30  835.2020395.30  836.0020408.00  831.2020453.50  830.5020688.70
GR 830.120888.60  830.2021129.60  834.1021277.00  835.7021472.00  835.2021665.50
GR 834.821725.00  831.6021743.60  828.2021784.90  827.8021917.30  832.5022005.80
GR 831.222196.30  833.8022337.70  828.8022436.10  828.6022624.00  828.6022651.00
GR 824.722683.10  824.5022776.90  827.3022816.90  825.7022848.20  825.7022953.40
GR 831.422979.30  829.5023040.90  837.6023092.60  841.8023105.10  838.4023299.80
GR 834.623332.90  835.9023541.50  838.1023744.30  839.9023938.80  842.1024215.50
GR 839.024377.10  835.0024400.10  839.6024419.10  840.5024635.60  840.5024842.60
GR 838.925030.00  836.8025220.10  836.0025265.40  840.7025377.90  839.4025587.10
GR 836.725749.90  844.7025789.90  844.4025806.20  837.8025833.70  836.3025897.70
GR 836.526097.80  836.8026286.40  840.2026340.40  843.3026351.80  844.3026366.80
GR 838.326379.30  840.2026471.00  844.6026551.30  844.9026708.20  841.0026797.00
GR 840.126884.00  843.8026896.70  844.5026922.90  842.0026939.10  842.3026961.00
GR 835.326977.40  834.8026986.40  839.8027000.60  841.3027135.70  836.8027281.80
GR 842.427374.30  844.6027645.50  844.8027974.50  846.0028176.30  846.1028338.60
GR 845.228356.50  847.3028360.00  847.7028593.70  847.9028782.80  849.5028995.90
GR 851.729188.00
HD182.64       10
HE182.64

NC0.0300    0.065    0.030     0.10     0.30
X1182.74       9518369.8420518.60  510.00  480.00  492.12
XL                            23800.00
GR 858.218343.30  841.4918369.84  828.6018390.30  828.4018634.30  828.9018900.00
GR 828.619093.70  828.9019287.80  827.7019475.70  829.4019654.50  830.1019873.40
GR 831.220058.10  831.1020251.70  829.9020436.50  837.1020459.70  830.6020518.60
GR 830.020706.60  830.8020906.70  832.8021106.10  834.3021233.00  836.1021486.70
GR 837.621691.20  829.5021758.60  831.1021902.80  830.1021947.40  831.8022132.30
GR 832.022304.40  832.4022468.30  828.4022522.70  827.8022572.90  824.7022603.00
GR 824.722815.00  827.3022860.90  830.0022886.20  837.9022913.00  840.8022935.60
GR 840.522956.80  827.9023004.90  825.8023172.40  831.0023304.80  836.8023362.60
GR 842.423509.90  838.9023525.50  834.3023647.60  835.8023829.00  837.5023861.00
GR 841.224050.70  837.9024177.40  840.7024360.00  839.0024406.50  836.7024422.40
GR 840.024470.40  841.8024688.20  842.7024918.00  839.1025102.70  838.3025311.60
GR 838.725514.10  839.0025710.90  840.1025776.70  844.0025873.60  840.4025906.90
GR 837.926102.50  836.8026293.60  837.3026346.20  839.2026350.50  844.1026389.90
GR 836.526417.60  836.0026478.40  836.7026661.90  836.3026853.10  836.0026912.60
GR 844.726933.00  845.9026958.90  840.5026977.50  839.4027007.00  835.1027014.30
GR 840.927042.80  842.0027233.40  842.1027279.00  841.7027573.30  842.4027849.20
GR 842.428032.90  843.9028203.80  847.9028395.20  847.9028435.00  845.5028440.30
GR 847.828496.00  849.0028666.80  849.3028705.50  849.9028971.90  851.3029168.70
GR 852.329466.80  853.8029666.20  853.2029703.20  855.8029764.70  856.9029947.00
HD182.74       10
HE182.74

NC0.0300    0.065    0.030     0.10     0.30
X1182.83       9618416.6720668.30  530.00  390.00  491.48
XL                            23932.40
GR 849.818410.40  841.7318416.67  838.6018419.10  829.0018428.60  828.9018567.90
GR 828.818644.20  828.9018978.80  829.7019130.90  830.0019323.00  830.0019467.70
GR 830.519616.10  829.4019767.10  829.7019800.70  833.4019813.90  832.2019865.30
GR 833.419886.20  829.7019902.00  831.3020034.50  829.0020076.10  829.9020224.30
GR 830.520357.00  831.1020493.80  837.4020525.90  832.6020595.30  831.7020668.30
GR 833.420782.60  834.1020956.50  834.6021116.10  835.6021416.30  836.0021648.00
GR 836.921704.80  830.7021771.30  831.5021988.00  832.5022150.00  834.6022299.60
GR 833.822370.20  824.4022392.70  824.4022467.00  827.1022493.00  825.6022630.30
GR 824.922764.20  824.4022775.00  824.4022885.00  837.8022924.10  840.6023059.00
GR 840.223145.50  828.0023175.50  829.6023193.60  826.7023273.70  828.3023444.90
GR 831.623580.70  838.6023661.40  837.1023819.90  842.5023932.40  840.8024109.30
GR 835.024190.00  843.0024335.50  837.9024474.00  840.7024520.30  840.3024717.80
GR 841.524893.70  841.0025031.20  841.4025184.80  841.2025317.70  839.6025450.60
GR 839.625579.80  840.9025714.30  840.0025881.40  839.9026034.70  837.1026105.60
GR 838.626123.90  839.0026302.90  838.5026518.90  836.9026666.50  836.4026818.30
GR 834.126961.80  834.1027027.80  840.6027039.10  841.5027068.10  836.7027077.60
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GR 836.527087.10  841.1027100.60  841.4027250.40  841.5027283.90  841.1027479.70
GR 841.027577.50  841.1027741.20  839.6027813.60  841.6027996.60  842.9028159.00
GR 843.228366.60  844.2028432.20  848.2028490.00  847.1028514.20  847.6028637.30
GR 848.328788.00
HD182.83      10
HE182.83

NC0.0300   0.065   0.030    0.10    0.30
X1182.92      9718472.6920589.40  505.00  490.00  496.47
XL                              24216.10
GR 853.218429.90  849.7018463.40  841.9718472.69  835.8018480.10  829.8018483.00
GR 829.018567.60  829.2018880.30  831.0019052.40  830.0019228.00  831.5019398.10
GR 830.519564.10  830.7019772.00  832.0019948.40  831.8020192.80  832.1020391.60
GR 830.120421.30  831.9020509.30  837.7020531.80  833.5020589.40  835.7020815.90
GR 836.121235.00  836.1021240.90  834.5021402.50  836.2021591.90  837.0021734.00
GR 831.921814.80  832.3022000.00  832.5022013.00  827.9022063.70  824.4022104.00
GR 824.422325.00  827.6022357.30  827.6022534.10  827.5022591.60  824.9022607.10
GR 826.522632.20  824.4022644.00  824.4022691.00  826.3022698.00  825.2022768.90
GR 831.622941.90  834.0023005.50  833.4023073.90  830.6023134.90  832.5023290.60
GR 830.023446.10  832.5023592.60  828.8023636.50  833.2023816.50  838.9023870.10
GR 840.024031.00  842.8024216.10  841.5024374.00  842.6024429.20  836.4024465.00
GR 838.524484.10  837.8024495.00  841.6024525.10  840.9024704.20  840.9024711.20
GR 840.824882.50  840.9025056.40  839.1025229.60  840.9025407.70  840.6025574.70
GR 840.625605.90  840.4025767.00  841.0025965.00  839.3026158.10  838.6026355.50
GR 836.626465.40  839.0026649.00  839.1026871.00  840.0027039.10  842.5027063.60
GR 840.727080.10  837.2027089.10  836.6027099.40  841.4027112.30  840.1027126.50
GR 842.227319.30  841.8027518.10  841.7027680.80  842.1027889.40  842.0028057.20
GR 846.628218.00  844.2028281.80  844.9028447.90  846.7028503.30  845.4028509.70
GR 847.728647.20  848.3028817.30  849.0029022.10  849.6029090.10  851.4029262.40
GR 851.329518.90  851.3029600.00
HD182.92      10
HE182.92

NC0.0280   0.065   0.030    0.10    0.30
X1183.02      9718635.9920589.50  525.00  385.00  494.50
XL                              24289.50
GR 853.818402.50  851.5018538.70  849.6018622.90  841.8618635.99  836.0018645.90
GR 834.918660.90  829.3018672.20  829.3018689.10  829.5019038.00  829.9019206.10
GR 830.119343.40  830.4019508.60  830.7019711.90  831.1019920.80  831.5020064.90
GR 832.820247.30  832.3020400.90  832.1020521.10  838.9020533.70  836.7020589.50
GR 837.020868.90  836.7020946.60  834.8021311.30  833.5021338.40  837.7021519.90
GR 838.121719.70  832.2021854.80  825.9021912.00  825.7021974.50  823.5021991.90
GR 826.222072.80  827.1022227.20  828.2022425.50  828.3022576.80  826.0022734.00
GR 824.422743.00  824.4022781.00  826.9022793.30  826.7022876.80  839.0022918.20
GR 839.823075.90  840.4023136.60  839.1023152.00  841.1023161.20  829.0023200.50
GR 831.423338.70  830.8023481.30  832.2023663.50  830.5023734.80  830.2023869.80
GR 837.623984.20  839.9024149.00  843.6024289.50  843.1024421.70  839.0024498.20
GR 842.624522.60  842.9024662.70  842.6024797.80  842.7024945.40  843.1025095.10
GR 842.225247.10  841.2025402.70  840.1025570.00  839.8025775.00  840.6025952.80
GR 840.526135.10  839.8026289.90  839.7026426.40  839.1026578.70  839.5026729.00
GR 841.126795.90  840.8027026.00  840.6027088.30  836.9027100.10  839.8027118.90
GR 839.027129.80  841.3027166.20  840.9027325.00  841.8027461.90  842.0027559.20
GR 841.027727.00  840.8027807.60  841.4027961.80  843.3028177.70  844.8028271.10
GR 844.728410.50  846.5028508.00  846.7028572.50  847.6028722.00  848.5028911.90
GR 849.929124.50  849.9029129.20  851.0029335.60  852.2029521.20  852.4029684.90
GR 852.629770.80  851.5029792.00
HD183.02      10
HE183.02

NC0.0320   0.065   0.030    0.10    0.30
X1183.11      9718793.1020769.30  480.00  555.00  494.40
XL                              24350.00
GR 854.718463.00  849.5018485.40  844.8018499.90  842.2018647.20  842.9018783.00
GR 842.118793.10  841.3018803.90  842.2018818.30  836.2018870.30  829.6018880.70
GR 829.618899.10  829.3019037.40  829.2019185.50  830.2019358.70  829.9019515.90
GR 830.319662.00  830.7019810.40  831.1019998.30  830.7020102.80  832.0020136.70
GR 831.220308.90  831.4020573.60  838.8020583.40  835.9020616.80  836.0020769.30
GR 836.020852.50  837.4021038.10  838.7021171.70  836.2021402.20  836.0021610.60
GR 835.121770.10  824.4021825.40  828.8021933.70  827.7022086.10  830.2022240.80
GR 831.822435.10  829.3022598.80  828.5022758.80  828.3022894.00  824.0022935.10
GR 824.822954.90  831.5022973.20  839.3022986.40  837.3023068.40  840.0023123.80
GR 842.123266.70  840.4023347.50  832.7023386.80  833.7023427.50  830.0023558.40
GR 831.223696.90  833.7023886.50  831.7024050.30  839.2024148.50  837.7024261.70
GR 839.524405.00  839.3024536.70  842.2024644.70  843.8024859.50  842.1025080.40
GR 839.825191.00  842.3025349.60  845.7025495.50  844.4025637.90  843.0025821.70
GR 842.325996.10  841.0026080.60  840.9026254.70  840.7026440.50  839.7026588.40
GR 839.526792.50  840.6026940.50  845.4027026.90  841.2027054.00  836.6027063.00
GR 836.727075.10  841.0027085.50  838.4027103.40  840.6027137.30  840.8027341.50
GR 840.527543.60  840.3027763.50  840.5027785.50  841.5027930.60  841.9028102.00
GR 842.728291.40  842.6028413.00  846.1028444.00  844.6028474.20  846.6028596.80
GR 847.228760.50  848.9028982.30  849.9029206.10  850.4029433.40  851.8029636.90
GR 852.129748.30  854.5029787.20
HD183.11      10
HE183.11

NC0.0280   0.065   0.030    0.10    0.30
X1183.20      9118909.1320601.90  475.00  600.00  495.51
XL                        18860.7024308.40
GR 852.418453.20  851.3018565.50  844.5018716.20  839.5018757.10  840.8018781.70
GR 845.118802.40  847.7018860.70  844.5018903.80  842.4418909.13  838.0018920.60
GR 829.718934.10  829.8019096.80  830.2019283.60  831.3019434.20  831.0019586.30
GR 831.319768.00  831.0019946.60  831.0019955.20  831.3020305.40  831.3020379.80
GR 831.420544.50  839.1020559.30  836.1020601.90  836.1021564.10  827.7021618.80
GR 826.921813.40  827.0021860.40  830.4022051.00  828.8022300.80  828.3022432.00
GR 825.522467.80  830.4022631.80  827.6022751.10  832.2022899.40  843.1022943.00
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GR 841.323094.40  843.5023280.20  843.4023313.60  836.9023341.30  832.4023416.70
GR 832.623598.00  832.9023784.30  835.4023941.00  831.9024042.30  841.4024122.50
GR 839.824172.70  841.9024217.20  840.0024225.60  843.2024308.40  841.6024462.10
GR 841.524484.00  839.6024668.50  840.0024893.00  841.7024978.80  843.7024992.70
GR 841.425149.90  843.0025350.10  845.8025465.20  845.9025601.00  841.8025615.30
GR 842.025845.10  841.5026067.30  841.5026162.80  841.4026341.40  841.5026534.20
GR 841.226711.60  841.1026864.10  840.9026905.70  841.9027010.60  842.1027162.00
GR 842.227252.80  841.6027487.40  842.0027668.50  842.4027836.90  842.5027996.10
GR 841.028147.40  843.3028243.40  846.1028254.50  844.7028284.20  840.5028295.70
GR 841.928309.90  845.7028321.90  846.1028540.80  847.4028733.90  848.0028894.20
GR 850.129003.80  845.1029067.90  851.2029174.50  851.2029334.20  851.5029533.60
GR 853.229599.00
HD183.20      10
HE183.20

NC0.0260   0.065   0.030    0.10    0.30
X1183.30      9318984.3020514.00  510.00  495.00  499.99
XL                                23988.80
GR 852.518650.10  848.6018737.00  848.7018790.50  844.5018860.20  842.4018924.00
GR 843.418984.30  837.2019015.10  836.5019030.90  829.9019042.30  831.1019242.10
GR 831.419338.50  831.4019507.20  831.4019706.60  831.4019796.90  831.4020183.30
GR 831.420330.40  831.4020473.40  838.7020491.20  836.1020514.00  836.1021340.00
GR 836.521350.50  827.6021478.80  827.7021541.60  830.5021559.90  828.2021582.20
GR 828.521636.70  827.7021831.20  829.0021967.60  830.5022136.50  830.1022286.80
GR 833.822359.90  827.0022396.10  825.7022420.30  831.3022426.10  833.6022427.00
GR 834.622532.50  831.6022720.90  832.0022826.00  840.9022879.00  846.5023112.30
GR 846.623223.00  839.8023267.10  838.9023297.90  835.7023333.50  835.7023500.60
GR 837.823696.10  839.9023884.70  847.1023988.80  843.9024126.00  848.2024172.20
GR 845.724390.60  846.3024536.40  846.6024590.80  842.1024819.60  842.1024977.90
GR 845.425137.00  842.6025262.80  843.3025345.40  846.0025346.10  844.6025392.70
GR 846.125419.00  841.1025429.90  843.4025433.10  841.3025460.30  843.2025646.20
GR 843.425885.00  842.8026124.30  841.8026176.60  841.7026431.00  840.9026651.70
GR 841.926730.80  844.4026740.60  841.1026779.10  842.1027033.60  841.8027238.20
GR 841.727424.60  841.8027642.90  842.3027838.70  841.8027992.10  843.9028066.40
GR 846.228090.20  843.8028111.40  840.5028119.50  841.8028132.50  845.8028143.50
GR 844.828359.10  846.2028594.50  846.3028607.60  847.3028836.90  848.6029046.50
GR 849.729230.90  850.3029380.80  853.0029458.50
HD183.30      10
HE183.30

NC0.0260   0.065   0.030    0.10    0.30
X1183.39      9719122.6220535.50  495.00  530.00  492.34
XL                                23857.10
GR 856.819042.70  852.4019063.50  847.4019103.70  843.0419122.62  839.1019139.70
GR 837.819174.50  831.5019184.50  831.5019368.60  831.5019762.70  834.0020461.80
GR 840.720475.20  835.6020535.50  835.5020713.90  834.4020874.20  834.1020912.40
GR 835.421094.40  834.8021270.70  836.7021300.90  827.4021345.50  826.9021502.60
GR 830.721643.50  830.7021761.10  833.5021929.90  830.8022059.30  835.3022119.40
GR 836.022246.50  834.3022396.80  834.8022437.80  827.0022489.00  828.5022522.20
GR 837.422578.30  833.7022704.10  830.6022799.80  830.9022843.20  839.3022966.00
GR 839.223038.50  841.6023188.40  843.1023248.30  837.3023310.50  837.8023478.10
GR 837.923707.60  837.8023806.90  844.7023857.10  843.5023936.00  844.6024006.20
GR 843.424069.20  847.9024111.00  845.9024172.00  846.1024369.70  845.5024480.00
GR 846.424615.50  843.8024840.40  843.7024861.50  841.7024992.70  841.6024998.60
GR 842.025170.50  846.9025301.30  847.6025427.00  846.6025579.90  846.5025663.40
GR 845.825831.00  845.6025949.20  845.4026124.80  847.4026353.00  846.4026484.70
GR 844.826615.80  844.6026642.60  843.6026802.00  844.8027008.20  844.5027240.40
GR 844.727284.50  844.7027430.40  844.8027646.30  844.2027852.80  844.1027884.00
GR 845.427887.50  846.6027958.10  839.9027966.40  840.8027978.40  845.6027994.80
GR 844.328041.80  845.4028232.50  845.5028405.50  845.7028482.30  846.4028680.50
GR 846.628711.40  848.0028953.20  849.6029091.60  849.7029104.00  849.6029232.20
GR 852.629269.80  851.0029318.50  852.2029451.80  852.6029514.60  853.0029714.80
GR 854.229898.20  854.7029989.00
HD183.39      10
HE183.39

NC0.0260   0.065   0.030    0.10    0.30
X1183.49      9819202.7720575.00  510.00  525.00  506.57
XL                                23691.90
GR 854.919103.60  853.2019115.00  854.9019120.80  855.0019165.90  850.0019172.10
GR 843.519202.77  841.3019213.40  839.8019239.50  831.5019251.60  832.1019469.60
GR 832.819700.00  835.0020348.60  835.2020453.80  842.9020474.20  838.7020575.00
GR 836.520749.00  832.6020899.40  833.7021092.40  833.9021255.10  826.9021357.40
GR 829.221425.80  827.1021549.60  831.4021710.30  832.7021776.50  830.7021876.90
GR 834.521922.20  834.4022033.60  837.4022112.10  834.4022251.10  832.6022481.30
GR 840.122673.80  846.1022751.20  846.3022803.70  837.5022872.20  836.1023060.00
GR 842.923167.70  839.1023179.00  837.4023182.00  837.4023245.00  838.0023250.30
GR 839.523299.00  837.4023457.40  835.8023549.50  841.3023644.30  843.5423666.04
GR 846.223691.90  845.7023741.30  847.4023790.20  846.2023812.70  846.5023921.20
GR 845.124016.20  849.4024069.00  847.9024093.10  846.4024256.40  847.1024440.30
GR 846.824621.30  846.2024803.90  843.6024970.60  846.5025139.10  843.6025341.70
GR 845.925526.30  847.7025630.90  847.7025912.00  847.5026140.00  847.4026300.80
GR 844.726418.20  847.2026464.00  845.2026483.70  845.7026657.20  846.1026821.30
GR 846.327082.70  846.1027264.60  845.8027368.90  846.3027524.90  846.0027682.80
GR 846.027738.70  844.6027746.50  847.1027791.50  847.0027825.50  839.7027837.40
GR 840.527844.80  846.6027858.90  844.2027888.50  845.6028040.90  845.9028096.50
GR 846.228247.00  846.7028496.10  847.8028688.60  848.3028819.80  848.4028979.60
GR 848.429133.70  851.2029140.60  851.0029234.80  851.8029412.60  853.4029685.60
GR 854.129784.30  854.8029938.00  855.0029985.30
HD183.49      10
HE183.49

NC0.0260   0.065   0.030    0.10    0.30
X1183.58      9719221.9220560.90  495.00  545.00  493.31
XL                                23810.40
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GR 856.618803.80  846.0018956.40  846.9018987.20  844.7019022.80  848.0019184.30
GR 844.719220.90  844.0719221.92  842.4019224.60  838.4019251.20  838.2019284.10
GR 833.019293.70  833.8019483.80  834.0019732.90  834.0019755.60  834.2019926.00
GR 834.720162.40  835.4020290.70  835.4020468.80  841.9020476.10  840.3020560.90
GR 838.320794.20  837.6020868.10  835.6021084.30  835.6021271.90  828.8021325.10
GR 830.221345.60  827.3021369.50  830.3021417.40  827.6021522.90  830.7021725.30
GR 834.721760.50  837.2021981.90  834.3022210.00  835.0022348.90  844.2022469.00
GR 847.222659.70  847.2022828.60  846.7022874.40  839.1022938.40  837.4022975.00
GR 837.423302.00  843.7023434.80  843.2023485.20  844.0723499.93  847.8023563.50
GR 847.423687.60  850.4023810.40  843.1023885.20  848.3023933.00  847.2023972.50
GR 846.824146.10  847.9024345.20  848.5024517.50  847.9024723.20  845.1024876.50
GR 847.025047.10  845.7025223.60  844.8025396.10  843.7025451.60  846.3025518.00
GR 845.425684.00  848.2025910.70  849.3026041.40  848.2026214.40  846.7026278.30
GR 848.626331.50  846.0026349.40  845.9026540.00  846.9026729.80  846.9026733.60
GR 846.426926.90  845.8027155.80  846.9027362.80  846.9027552.10  846.2027692.40
GR 840.727702.60  841.2027710.90  848.5027723.60  845.6027774.80  846.4027949.60
GR 846.628228.20  846.7028260.30  847.0028463.30  847.4028646.60  848.2028834.80
GR 848.629006.10  851.0029175.90  851.7029265.70  854.4029487.90  854.3029608.60
GR 854.329814.30  854.6029843.10  855.4030028.70  855.8030294.00  857.2030328.30
GR 859.030344.40  858.8030376.10
HD183.58      10
HE183.58

NC0.0260   0.150   0.030    0.10    0.30
X1183.67      9819240.7520571.20  475.00  585.00  489.05
XL                                23585.80
GR 859.719177.20  849.8019207.60  844.8519240.75  839.7019275.30  840.1019323.20
GR 834.419335.50  835.5019488.60  835.3019644.50  835.8019855.70  835.3020026.60
GR 835.320097.80  835.6020489.80  844.4020496.60  840.9020571.20  839.9020775.10
GR 838.220913.90  837.1021090.20  837.6021248.90  836.9021288.30  827.2021332.10
GR 831.421381.10  836.7021404.90  837.0021421.00  830.1021451.20  828.5021497.70
GR 830.621518.70  830.7021645.20  834.3021692.00  835.3021877.50  837.2021921.30
GR 834.822090.90  835.3022133.50  842.9022181.90  845.3022339.20  844.5022410.10
GR 847.822478.50  847.4022652.00  848.1022701.00  839.2022722.30  840.0022764.40
GR 837.422775.00  837.4023039.00  838.2023129.80  843.5023224.40  844.8523317.77
GR 845.823383.00  848.6023585.80  848.7023684.80  847.2023747.50  850.0023816.20
GR 846.123824.30  849.2023907.20  848.7024061.00  850.0024189.10  848.4024412.50
GR 847.024506.10  847.9024659.70  847.3024760.50  844.3024856.70  847.8025023.90
GR 849.225107.40  848.1025321.70  846.8025536.80  846.9025691.60  847.0025785.30
GR 844.525824.40  848.4025978.30  847.1026152.20  849.0026180.00  846.3026226.90
GR 846.826395.00  846.8026582.50  846.8026740.00  846.7026859.10  846.2027093.60
GR 846.727251.20  845.7027401.90  846.1027472.00  848.3027554.80  842.8027565.40
GR 842.727572.20  847.0027586.50  846.1027780.40  846.7027970.50  847.0028200.40
GR 847.028315.00  847.3028471.00  848.1028643.10  848.3028814.20  849.6028854.80
GR 851.128861.30  851.1029072.80  852.0029229.50  852.0029268.30  852.1029428.20
GR 854.229691.10  855.0029892.10  855.2029923.00
HD183.67      10
HE183.67

NC0.0430   0.065   0.030    0.10    0.30
X1183.77      9719179.6620510.70  515.00  540.00  511.32
XL                                23555.10
GR 859.418950.70  859.0018976.90  854.5019031.60  846.2019101.10  847.1019160.10
GR 846.019179.66  844.3019209.00  839.1019227.30  844.8019259.40  846.0019284.50
GR 841.719327.30  841.4019363.90  834.8019379.90  835.3019585.70  835.5019741.80
GR 836.220095.20  836.6020236.90  837.1020441.20  840.2020465.10  844.4020475.70
GR 845.920510.70  842.2020607.70  841.1020802.00  840.6021080.60  840.1021173.20
GR 840.621218.70  835.2021255.20  837.7021339.60  836.9021358.30  840.2021378.20
GR 836.321435.20  840.2021492.40  836.0021549.20  835.7021596.20  833.0021611.20
GR 834.221658.70  837.3021689.90  834.8021795.90  839.8021803.90  841.4021818.50
GR 839.121871.80  836.4021889.50  841.5021894.00  840.2021945.90  843.9022036.00
GR 844.822123.00  847.2022148.60  846.5022312.40  848.4022350.90  846.3022417.30
GR 849.622588.00  835.9022640.20  840.9022791.00  837.4022803.00  837.4022875.00
GR 837.522942.20  845.9823107.11  846.0023107.50  847.6023339.90  849.3023555.10
GR 847.823871.60  847.6024084.40  847.4024318.20  849.7024478.30  847.8024519.80
GR 847.824728.90  846.7024950.30  849.1025123.70  848.7025344.20  847.9025588.70
GR 846.525802.80  847.0025986.00  844.2026026.10  847.8026069.00  846.2026104.20
GR 846.726412.30  846.6026744.60  846.6027006.30  846.5027274.60  849.3027421.30
GR 842.927432.30  842.9027440.10  848.5027457.10  845.7027572.50  846.3027872.70
GR 846.528074.80  847.5028275.00  847.8028491.20  848.6028692.00  848.4028714.30
GR 849.828720.00  850.5028988.10  851.7029206.30  852.3029464.50  854.0029764.60
GR 854.229983.90  857.1030151.40
HD183.77      10
HE183.77

NC0.0430   0.025   0.030    0.10    0.30
X1183.86      9619255.9020596.90  475.00  550.00  485.05
XL                                23263.30
GR 859.318950.10  846.7019063.30  843.5019139.40  844.5019212.40  840.6019236.70
GR 841.419251.10  844.2019255.90  843.2019341.60  835.4019359.40  836.0019598.50
GR 836.519868.80  836.8020087.50  836.9020261.50  837.2020497.70  846.3020510.30
GR 841.420596.90  838.6020754.60  839.5020915.20  838.1021050.40  841.8021077.90
GR 842.521101.10  837.4021120.00  839.4021289.80  842.9021328.10  843.0021442.10
GR 838.721466.60  838.7021534.90  831.5021604.70  834.4021605.50  837.3021608.90
GR 838.921650.40  835.2021660.40  837.7021703.20  836.5021706.40  837.5021742.90
GR 835.121756.90  842.9021819.70  844.7021823.30  845.2022104.30  846.3022226.50
GR 841.622444.90  841.8022507.40  836.3022565.50  839.4022654.40  837.9022753.00
GR 842.422829.90  837.4022848.00  837.4022913.00  846.5022939.00  850.2023166.70
GR 850.423263.30  848.0023307.90  848.6023533.60  849.5023751.30  849.5023797.70
GR 849.524014.00  849.8024213.90  851.4024223.20  847.9024246.70  848.7024485.90
GR 848.724716.00  848.6025041.20  849.1025209.30  850.3025255.80  845.6025282.20
GR 847.325527.80  847.1025773.90  849.7025906.00  843.8025928.50  846.2025981.40
GR 846.426222.60  847.3026464.70  850.0026646.00  849.8026865.40  847.5027105.90
GR 849.927283.60  846.2027301.50  847.7027582.70  847.4027795.10  848.9027851.10
GR 843.027859.50  841.7027869.80  847.5027893.60  847.2028137.40  847.3028370.50
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GR 847.228591.40  848.7028810.30  850.5029098.80  851.3029328.40  852.9029616.20
GR 854.329780.80  857.2029909.90  855.2029971.40  856.7030220.70  856.8030312.90
GR 859.130357.00
HD183.86      10
HE183.86

NC0.0430   0.043   0.030    0.10    0.30
X1183.96      9719223.0020568.50  480.00  550.00  485.76
XL                              23022.80
GR 857.218803.40  853.7018900.50  846.5018994.00  846.1019100.40  844.2019110.80
GR 847.419223.00  844.1019272.10  844.7019297.90  842.7019309.30  836.2019320.50
GR 838.219373.50  835.9019378.20  836.5019719.80  837.0020170.50  837.2020510.70
GR 844.120522.50  841.6020568.50  840.2020916.00  844.3020963.10  839.9021017.40
GR 842.821056.10  843.2021270.90  840.1021277.50  831.7021315.40  832.7021383.20
GR 841.521397.30  838.7021401.80  830.7021405.70  841.6021525.30  834.8021537.80
GR 840.321542.50  841.0021580.70  833.1021604.40  840.1021614.10  836.9021626.40
GR 836.621658.70  838.4021661.60  837.6021684.80  835.8021689.10  837.8021702.40
GR 839.522028.80  839.9022070.30  834.9022153.40  838.7022238.20  846.9022306.80
GR 844.822413.60  839.7022480.10  842.3022618.80  836.8022736.10  840.6022835.10
GR 832.222869.40  833.9022900.90  839.3022933.70  836.8022983.30  848.3323016.07
GR 850.723022.80  850.4023359.90  851.4023821.90  850.0024009.00  853.1024035.40
GR 851.724066.90  850.3024077.40  850.9024173.00  849.5024185.30  850.2024534.20
GR 850.324905.30  848.9025050.00  851.7025097.50  848.6025105.00  849.7025496.00
GR 850.725738.00  845.4025769.80  846.4026147.00  847.7026374.40  850.7026423.50
GR 848.926661.10  853.2026770.70  851.3027007.50  848.7027028.70  851.3027122.50
GR 846.627137.70  848.7027330.10  848.1027718.20  848.0028038.30  849.4028220.20
GR 851.728244.60  847.8028247.30  849.1028263.80  845.7028265.50  843.2028282.20
GR 848.528288.30  846.1028417.90  848.6028776.80  850.0029098.60  851.9029484.60
GR 856.029816.50  857.3029976.00
HD183.96      10
HE183.96

NC0.0430   0.043   0.030    0.10    0.30
X1184.05      9819242.3020764.90  505.00  475.00  504.20
XL                          18829.4023051.00
GR 857.918408.60  846.5018759.40  849.0018771.10  851.4018829.40  849.2018994.30
GR 848.819001.44  845.4019061.90  846.3019086.40  843.7019097.50  847.4019120.30
GR 843.819242.30  844.4019343.80  836.2019379.20  836.3019462.20  836.8020011.60
GR 837.120395.30  837.3020540.60  846.3020556.60  843.1020764.90  844.7021005.00
GR 841.921145.80  838.0021175.90  839.6021258.30  837.0021300.20  833.7021306.90
GR 838.021308.40  841.0021311.60  830.9021331.60  835.4021331.70  836.4021350.00
GR 830.121359.00  830.5021387.30  837.6021389.00  840.1021398.70  835.1021427.90
GR 841.521430.00  833.6021450.30  831.8021450.50  834.8021459.80  835.7021473.00
GR 833.921473.30  840.4021498.10  839.9021566.90  834.9021580.10  832.9021581.00
GR 838.121613.30  833.4021637.80  836.7021649.40  838.4021721.60  842.3021722.90
GR 842.822068.30  842.6022137.00  845.4022248.00  842.3022310.70  842.6022366.20
GR 850.022428.00  849.2022618.20  840.1022651.60  837.2022693.50  832.2022725.20
GR 833.422765.10  838.0022788.10  836.1022860.80  843.0023010.90  848.8023034.63
GR 852.823051.00  851.6023465.00  852.1023875.50  852.1023949.40  848.4024055.50
GR 851.624151.30  851.7024382.70  849.4024447.10  851.8024580.00  850.7024954.80
GR 851.525376.80  849.1025766.90  851.9026041.10  838.8026092.40  840.3026122.20
GR 852.426172.50  850.7026236.40  847.5026304.30  848.9026675.20  850.7026978.80
GR 846.926993.10  848.7027377.60  847.9027756.40  848.1028116.20  848.7028225.90
GR 842.728229.60  842.5028241.30  849.7028252.10  847.2028374.20  848.7028952.60
GR 852.629347.50  856.4029758.50  856.6029973.30
HD184.05      10
HE184.05

NC0.0430   0.025   0.030    0.10    0.30
X1184.14      9819300.3020757.70  490.00  440.00  493.72
XL                          18996.0022996.00
GR 861.718514.60  858.9018742.90  845.8018903.40  849.5018996.00  849.4518997.92
GR 846.819094.20  845.9019300.30  845.6019361.10  836.2019396.40  836.4019552.40
GR 837.019992.90  837.4020277.00  837.6020504.50  837.3020570.20  842.2020587.10
GR 841.720658.90  839.0020697.00  841.2020757.70  838.5020802.00  844.7020850.40
GR 842.420941.90  843.6021027.60  836.3021069.20  836.2021153.80  834.1021153.90
GR 842.421182.60  831.8021197.50  839.8021210.20  838.6021291.40  834.4021298.80
GR 832.321299.80  837.3021322.00  833.1021326.70  835.6021328.80  840.9021350.80
GR 833.021423.10  839.2021448.80  831.0021455.30  832.2021484.80  840.2021514.10
GR 838.721547.10  841.2021564.50  840.2021632.60  844.3021691.20  839.7021902.40
GR 843.122048.20  844.3022268.20  842.8022322.20  849.0022419.50  850.0022560.80
GR 832.022606.90  836.1022842.40  838.9022964.50  849.4522992.19  850.9022996.00
GR 849.723249.60  850.0023478.40  849.9023657.90  849.5023838.30  849.5024034.10
GR 849.524312.50  848.6024529.80  847.4024676.30  848.0024879.70  848.2024946.00
GR 848.125125.80  848.0025307.70  849.3025492.70  847.0025535.20  846.2025736.70
GR 847.925934.30  847.9026175.60  847.8026230.10  848.9026507.50  846.4026660.30
GR 850.026767.10  848.0026783.80  850.1026837.30  848.7026879.10  850.7026889.80
GR 848.326897.10  848.9027135.90  849.2027356.00  849.5027541.00  849.0027762.90
GR 849.027981.30  847.6028169.10  848.5028396.80  849.3028603.10  849.5028696.50
GR 849.328921.20  849.9029191.90  852.9029395.60  855.3029611.20  856.1029799.00
GR 856.929981.50  857.8030182.00  859.5030396.00
HD184.14      10
HE184.14

NC0.0320   0.025   0.030    0.10    0.30
X1184.24      9719272.7020645.20  505.00  520.00  504.24
XL                          19272.7023080.90
GR 860.318844.80  859.2018931.30  855.3019049.20  844.9019174.10  848.0019272.70
GR 847.919431.50  841.9019445.70  836.8019467.10  837.6019619.10  838.0019885.40
GR 837.720076.00  837.4020313.90  837.0020631.30  841.7020645.20  841.8020829.30
GR 839.620979.60  834.2020990.50  832.2020998.60  839.1021047.00  831.7021115.60
GR 835.221127.80  835.6021146.60  831.5021157.20  840.6021188.40  843.0021271.60
GR 842.221319.50  843.7021336.20  839.6021338.30  841.3021375.10  843.9021381.20
GR 842.221514.20  837.9021516.70  841.5021561.90  839.7021732.30  841.4021937.20
GR 842.622047.20  846.4022157.20  845.8022279.60  847.4022358.50  845.7022412.10
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GR 845.722505.00  839.1022569.50  837.2022652.80  832.3022674.90  835.1022823.70
GR 837.522884.50  841.5022911.30  840.6023054.00  849.9423074.94  852.6023080.90
GR 848.423202.60  849.4023413.70  849.6023671.70  850.0023881.50  849.6024047.90
GR 849.624257.10  848.6024420.00  847.7024540.50  847.9024698.20  847.8024725.00
GR 848.524918.90  848.5024930.00  848.5025105.80  848.2025306.30  848.0025556.90
GR 847.725718.10  848.1025854.80  847.9026083.70  847.8026376.90  846.3026591.20
GR 848.426641.40  849.2026784.40  853.6026848.10  851.2027029.60  848.5027242.30
GR 847.427305.20  847.3027467.40  847.2027740.50  846.8027953.80  846.2028138.90
GR 846.628321.00  848.0028495.20  848.6028744.30  848.8028997.50  848.9029203.50
GR 850.129293.50  851.4029318.30  845.7029327.10  844.9029336.80  851.1029344.70
GR 851.229521.30  852.4029678.70  855.7029740.40  856.7029898.30  857.6030060.70
GR 860.030270.30  860.2030375.00
HD184.24       10
HE184.24

NC0.0260   0.150   0.030    0.10    0.30
X1184.33       9819270.5020742.20  515.00  320.00  499.71
XL                              23318.40
GR 861.119243.80  849.3019270.50  845.3019330.00  838.6019383.50  837.1019491.20
GR 838.219658.90  838.1019876.30  838.0019954.50  837.2020567.40  837.7020712.40
GR 844.220742.20  843.3020902.30  843.3021026.30  840.5021167.50  842.3021278.40
GR 838.321498.70  841.4021627.90  841.2021790.60  841.8021943.30  845.6022053.50
GR 842.922169.40  848.7022318.50  850.3022453.20  846.1022468.20  840.6022480.50
GR 837.022619.70  836.7022806.70  839.2022962.00  831.9022986.50  833.0023013.90
GR 842.023037.70  841.9023067.40  846.8023089.90  845.8323135.00  845.5023150.20
GR 848.623187.00  848.4023270.20  850.5123285.43  850.7023286.80  851.0023318.40
GR 849.323345.80  849.1023503.30  849.3023661.80  850.8023836.70  851.4023996.90
GR 849.524204.00  849.7024361.90  847.3024372.80  847.7024596.20  848.5024816.20
GR 848.824881.20  848.8025069.10  848.2025224.60  847.5025381.40  847.6025562.20
GR 847.725578.10  848.0025806.90  846.9026003.70  847.9026272.00  847.4026459.90
GR 847.426529.00  849.0026535.60  849.3026609.70  850.5026618.00  847.4026680.00
GR 853.126721.80  852.9026768.30  852.7026929.10  852.7026960.60  852.6027136.90
GR 852.627289.60  851.6027366.20  849.7027398.90  848.1027468.50  850.3027479.20
GR 848.627565.60  851.9027596.80  847.5027675.00  847.2027843.00  847.9027877.70
GR 846.627887.00  848.0028118.10  848.4028311.30  847.4028573.60  848.6028657.40
GR 848.528889.80  848.3029142.90  850.5029219.90  845.8029228.20  845.0029238.00
GR 851.329247.00  850.6029354.60  852.0029364.50  851.5029517.70  851.8029606.70
GR 855.329632.70  856.5029845.10  857.7029999.00
HD184.33       10
HE184.33

NC0.0280   0.025   0.030    0.10    0.30
X1184.43       9819038.6520786.30  310.00  440.00  505.74
XL                              23232.40
GR 860.319020.10  851.0919038.65  839.5019062.00  837.9019089.90  842.5019263.00
GR 843.219286.60  837.3019302.00  837.9019540.20  840.3019564.20  837.9019583.70
GR 841.019705.80  838.2019739.00  838.1019938.00  838.0020009.50  837.8020227.90
GR 838.520378.10  839.9020648.50  841.1020724.80  842.8020732.10  842.4020786.30
GR 844.220797.30  845.5020797.60  846.9020806.30  845.1021006.40  844.0021178.30
GR 839.621367.50  840.2021613.90  842.9021725.30  842.5021884.50  843.2022005.80
GR 839.722033.70  839.4022061.80  842.1022083.80  843.5022263.00  842.5022403.10
GR 838.522434.20  840.9022515.30  839.4022545.40  839.5022754.90  839.5022781.40
GR 834.422794.50  834.3022820.10  838.5022852.40  839.2023031.00  840.8023202.60
GR 851.123230.48  851.8023232.40  850.1023444.40  850.4023507.50  850.6023682.90
GR 850.723715.50  850.9023919.80  851.3024168.20  852.1024413.40  851.0024458.10
GR 847.624489.20  848.8024681.90  848.9024925.50  847.7025105.20  848.4025209.30
GR 849.025383.60  848.7025616.00  848.7025636.50  847.9025810.60  848.2026105.50
GR 848.026336.10  847.8026414.50  850.4026466.60  848.5026492.20  848.3026685.80
GR 849.026772.60  852.5026816.70  853.9026988.60  853.3027160.90  853.3027167.40
GR 852.527355.40  850.9027535.20  851.5027607.90  847.5027780.90  848.4027981.90
GR 848.428194.00  848.0028391.30  848.5028661.10  848.9028868.90  848.4029043.10
GR 850.429108.60  845.2029118.70  846.0029127.30  850.2029133.40  850.5029335.80
GR 851.129506.50  855.3029535.50  855.9029748.50  857.2029921.20  858.6030133.50
GR 858.630305.40  863.9030468.00  862.8030494.60
HD184.43       10
HE184.43

NC0.0430   0.025   0.030    0.10    0.30
X1184.53       9719138.5020792.60  480.00  420.00  508.72
XL                              23336.00
GR 865.218333.60  850.2018397.50  845.8018437.20  835.4018470.00  835.5018507.10
GR 839.418534.50  836.3018613.70  839.2018669.70  835.4018718.30  838.5018880.30
GR 847.818940.20  847.7019138.50  847.7019157.20  837.9019172.30  838.6019442.50
GR 840.819459.70  840.8019620.50  838.7019644.10  838.6019763.00  838.4020082.90
GR 839.020247.90  840.6020700.60  839.1020703.60  846.9020716.00  845.2020792.60
GR 846.320793.60  847.4020933.50  845.6021172.80  843.3021226.00  843.1021294.90
GR 840.921313.10  843.8021455.60  844.8021698.10  842.4021891.50  841.0022048.40
GR 844.522150.10  841.3022215.60  842.4022236.80  841.2022309.30  844.6022378.70
GR 840.222401.40  840.4022589.20  842.9022675.20  834.3022699.00  836.1022730.50
GR 840.122744.70  840.6022937.80  840.6023132.50  842.2023311.50  851.5923333.63
GR 852.623336.00  850.7023520.20  851.8023761.50  851.5023821.10  851.3024035.80
GR 852.324271.50  852.3024505.10  852.1024701.50  852.7024940.90  852.8025020.80
GR 850.125215.70  851.6025270.20  848.8025293.40  848.4025582.70  848.1025905.20
GR 848.526136.80  849.1026318.30  848.7026508.00  849.1026762.40  848.9026883.80
GR 851.526936.60  848.2026998.70  853.8027145.80  853.0027351.90  852.4027534.30
GR 852.427594.20  847.3027721.10  848.1027902.20  848.3027934.00  849.3028117.70
GR 848.928348.90  849.9028602.00  850.0028827.00  850.8028992.10  845.2029001.60
GR 845.629008.80  850.8029016.80  850.4029228.50  850.4029399.50  855.1029427.20
GR 856.029612.50  856.9029794.50  857.4030000.60  857.9030192.80  858.6030316.20
GR 860.830324.90  863.2030397.00
HD184.53       10
HE184.53

NC0.0430   0.025   0.030    0.10    0.30
X1184.62       9819149.9020685.00  490.00  385.00  508.57
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XL                                  23314.00
GR 858.317810.50  860.2017845.80  857.4017854.70  858.1017930.70  855.3017944.00
GR 852.218073.60  851.9118075.53  848.8018096.40  838.6018118.30  837.1018166.70
GR 839.818194.30  835.4018219.80  835.8018249.10  839.0018261.40  835.6018394.50
GR 838.418466.90  838.0018554.40  848.5018618.50  847.9018831.90  848.8019088.70
GR 848.119149.90  838.2019176.80  838.9019416.80  838.9019693.70  838.5020015.70
GR 838.620136.90  846.0020318.90  844.7020628.00  841.5020659.70  847.9020665.20
GR 844.120674.10  847.6020685.00  847.3020928.70  844.6021102.80  841.9021139.90
GR 845.521275.10  843.5021369.40  845.1021591.80  842.8021721.00  844.2021924.10
GR 843.722135.20  842.7022379.20  844.5022552.20  840.6022745.60  841.9022775.10
GR 834.622788.20  835.6022811.70  840.8022830.60  841.8023056.00  840.5023270.80
GR 843.023288.10  851.9123309.88  853.6023314.00  851.8023362.90  851.7023539.20
GR 852.023757.80  852.0023985.00  852.8024280.80  852.9024509.60  852.9024712.50
GR 853.924894.40  851.7025121.00  851.7025128.10  849.2025136.20  848.8025376.30
GR 848.825610.00  849.8025830.70  849.0026083.20  849.0026285.20  849.0026496.20
GR 848.126721.80  848.1026934.50  848.7026962.70  852.3027049.00  849.9027074.30
GR 853.127290.20  852.8027492.20  848.6027512.90  848.5027752.30  849.0027967.40
GR 849.528302.50  850.0028538.20  849.3028791.50  851.4028870.20  845.3028878.90
GR 846.528892.20  850.7028897.50  850.5029069.70  852.1029092.90  851.0029287.80
GR 855.729311.40  856.0029547.20  856.2029762.10  856.5030002.70  859.1030205.40
GR 861.930245.50  859.8030261.00  860.9030283.00
HD184.62      10
HE184.62

NC0.0650   0.025   0.030    0.10    0.30
X1184.71      9819208.8020640.90  640.00  605.00  480.91
XL                      17970.0023326.00
GR 865.217701.80  865.2017754.20  855.7017794.50  855.8017803.10  842.4017934.30
GR 844.317953.60  842.9717970.00  839.5018013.00  836.5018182.20  839.6018199.90
GR 838.418266.00  841.4018322.60  841.2018362.40  838.8018378.10  836.1018426.70
GR 852.618473.20  851.2018779.80  850.3018976.50  849.6019159.20  849.5019208.80
GR 839.319226.80  839.3019254.90  839.1019437.80  839.1019535.10  838.8019882.80
GR 840.320062.60  849.1020445.70  848.9020466.40  854.5020498.30  840.6020620.70
GR 848.820640.90  847.9020879.10  848.1021116.40  841.6021297.40  845.6021384.30
GR 844.421570.10  844.4021772.40  845.7022004.70  843.4022187.10  844.6022277.80
GR 843.022334.60  844.0022504.70  845.5022668.50  847.0022683.40  839.2022799.30
GR 839.722984.30  836.9023119.10  842.9023141.90  842.4023280.40  847.4023310.70
GR 852.223322.87  853.4023326.00  851.9023570.50  852.5023791.70  852.6024003.70
GR 852.824058.20  853.7024280.10  853.7024474.10  853.2024647.70  853.7024895.80
GR 853.524987.20  852.7025181.10  852.5025250.00  851.2025531.00  851.2025551.50
GR 851.725794.00  852.0026016.70  852.0026089.90  852.0026266.00  851.9026453.90
GR 851.326634.00  851.1026692.90  850.7026955.50  850.7027001.00  851.0027198.60
GR 850.427385.00  849.6027565.90  849.9027738.60  849.6028041.80  849.4028236.20
GR 849.628410.90  849.0028629.70  852.0028709.20  846.6028720.50  851.4028743.20
GR 850.528972.00  850.7029143.00  855.0029159.70  855.2029342.80  856.1029517.10
GR 856.329747.80  856.7029931.40  858.8030102.10  859.9030300.70  860.4030478.80
GR 860.530652.30  862.0030828.90  863.1030985.00
HD184.71      10
HE184.71

NC0.0650   0.025   0.030    0.10    0.30
X1184.81      9819220.6020620.20  685.00  570.00  505.87
XL                                  23491.00
GR 872.417481.30  865.2017513.80  862.1017515.10  861.0017534.80  854.5017767.50
GR 854.517807.70  852.6417821.42  851.0017833.50  842.3017848.30  836.7017902.90
GR 838.417910.30  838.2018016.60  835.5018036.60  839.4018080.40  840.5018140.00
GR 837.218212.30  835.4018389.10  841.2018443.50  845.7018466.30  847.1018535.70
GR 852.618566.20  851.4018872.70  852.3019115.60  850.8019220.60  839.6019241.90
GR 840.219482.00  840.2019570.80  844.9019860.70  846.5020006.60  851.1020348.30
GR 852.320463.70  855.9020488.60  851.3020509.50  849.5020535.40  845.3020550.40
GR 840.320592.20  850.5020620.20  847.0020873.60  846.0021107.20  841.0021302.30
GR 846.921439.20  846.7021679.90  849.6021916.10  847.4022159.10  848.3022401.40
GR 849.922633.40  850.6022810.00  843.1022900.80  840.6023104.40  836.1023167.40
GR 838.723248.80  839.4023349.30  844.8023381.60  838.3023407.50  840.3023430.90
GR 852.623474.02  857.5023491.00  851.5023576.40  852.3023871.60  852.3024102.20
GR 852.824332.60  852.6024536.90  855.1024597.90  853.2024647.00  853.4025029.20
GR 852.525302.10  852.4025641.40  851.2025831.10  854.4026024.10  854.5026324.70
GR 853.326687.60  852.7026985.30  852.1027227.90  849.5027301.80  849.9027620.20
GR 850.727855.30  850.0028129.50  849.6028447.70  852.9028580.10  847.2028590.90
GR 847.728599.40  852.4028609.50  852.0028845.80  854.0029079.00  854.8029338.50
GR 855.929585.00  857.6029830.90  860.5029874.10  860.1030147.60  860.6030382.90
GR 861.930630.10  862.5030917.10  863.3031164.90  864.2031190.70  867.4031205.30
GR 869.731588.90  869.8031608.50  872.2031842.10
HD184.81      10
HE184.81

NC0.0650   0.025   0.030    0.10    0.30
X1184.90      9819293.1020722.00  680.00  445.00  473.98
XL                                  23564.70
GR 865.217265.80  861.8017307.80  861.7017389.20  857.8017456.10  861.3017472.40
GR 857.017620.60  855.2017625.60  854.4017668.10  853.7017670.88  852.5017675.60
GR 854.217676.30  851.6017690.10  843.2017704.10  840.3017874.60  841.7017942.10
GR 837.017977.70  843.1018019.70  836.5018092.50  838.8018135.90  837.0018174.20
GR 840.318453.70  843.8018483.00  844.2018527.40  850.8018561.80  853.6018815.20
GR 853.019098.70  853.0019293.10  845.1019302.50  839.8019312.30  840.5019582.50
GR 845.119866.40  850.3020210.70  850.4020457.40  857.5020478.60  853.0020500.20
GR 849.020538.10  840.9020585.20  848.7020628.30  848.4020647.50  854.1020722.00
GR 847.620777.00  846.9021070.40  850.6021192.20  846.7021205.30  843.0021327.50
GR 839.821355.30  845.9021431.60  851.1021681.30  848.1022002.90  847.8022188.50
GR 850.022379.60  849.5022478.40  853.3022598.40  852.0022709.80  850.3022728.00
GR 843.322750.60  844.5022938.20  840.7022982.60  837.3022997.20  840.4023030.80
GR 840.423096.90  845.7023136.90  840.2023178.00  841.7023475.20  842.5023522.70
GR 853.723562.89  854.2023564.70  854.0023720.00  852.7023996.30  853.5024382.70
GR 857.124452.50  853.4024515.80  854.5024904.30  854.5025269.70  854.9025587.40
GR 854.625805.70  854.8026078.20  854.3026447.00  853.7026891.20  852.2027123.40
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GR 850.227157.20  851.0027556.90  851.0027926.70  850.5028203.30  853.9028443.10
GR 847.128452.00  848.7028463.20  853.2028469.50  850.9028497.70  851.8028783.00
GR 855.129091.10  856.2029423.90  857.3029704.60  860.9029754.60  859.9030055.10
GR 861.030367.50  862.3030692.50  864.1030984.00
HD184.90      10
HE184.90

NC0.0650   0.025   0.030    0.10    0.30
X1185.00      9719377.9020837.70  505.00  555.00  516.75
XL                              23545.00
GR 858.117508.60  858.0017588.30  862.7017642.30  861.9017648.10  854.5017660.52
GR 853.517662.20  843.0017687.80  844.1017735.10  842.2017743.10  840.7017811.00
GR 843.917871.00  841.1017970.00  843.8018021.80  843.7018108.30  839.1018151.50
GR 836.618426.90  836.6018445.60  842.6018509.30  842.0018566.30  853.4018616.00
GR 857.418820.80  854.4019165.60  852.9019377.90  855.9019394.00  841.7019419.30
GR 844.719549.90  846.2019741.40  842.2020628.60  842.0020640.70  848.8020670.10
GR 853.620837.70  851.9021060.00  852.6021222.50  849.9021286.00  850.0021498.70
GR 851.921600.00  850.7021634.50  852.0021730.90  847.4021938.50  855.2022135.80
GR 852.522218.00  852.4022261.60  855.3022278.10  853.8022430.80  847.4022510.20
GR 851.622744.50  845.4022899.20  848.9023129.30  847.2023352.10  845.0023508.20
GR 852.623545.00  850.6023583.50  851.7023819.00  851.7024012.50  849.9024049.10
GR 860.224139.50  859.7024208.70  855.5024283.90  854.6024487.00  855.0024719.90
GR 855.024837.50  854.9025089.90  855.3025233.10  857.8025339.90  857.1025461.20
GR 855.325481.40  855.3025575.10  855.4025885.90  855.5026087.50  854.5026313.80
GR 854.326531.20  854.3026788.30  853.4026968.00  850.9026985.10  851.9027205.60
GR 851.927420.40  851.2027630.40  851.6027843.20  851.9028049.50  853.0028247.10
GR 855.428284.10  847.9028293.10  849.8028304.20  854.8028310.10  851.5028351.50
GR 853.128570.30  854.5028774.90  854.9029012.50  856.1029273.20  857.4029498.90
GR 858.129572.60  860.2029580.10  860.1029782.90  860.9029997.40  861.5030205.10
GR 863.530484.00  863.6030493.00
HD185.00      10
HE185.00

NC0.0650   0.025   0.030    0.10    0.30
X1185.10      9719417.6020877.50  575.00  415.00  544.41
XL                              23454.30
GR 864.717525.40  863.6017561.20  855.1817609.35  853.9017616.70  845.8017639.80
GR 846.417748.70  843.1017820.40  842.9018010.70  840.5018257.60  838.5018334.90
GR 842.518554.10  841.8018749.40  842.0018940.40  846.2019062.40  843.3019251.20
GR 854.919339.30  856.3019417.60  843.7019444.10  843.8019592.20  843.2020088.90
GR 842.620307.20  842.4020626.80  842.6020734.00  850.1020779.40  851.5020877.50
GR 851.721099.60  851.6021317.00  852.4021546.60  852.8021747.20  850.0021863.50
GR 856.322061.20  858.7022185.20  853.8022221.00  858.2022248.80  858.8022452.80
GR 858.022635.00  850.6022698.30  850.8022743.60  846.1022764.00  846.9022967.80
GR 848.523042.00  851.9023096.70  849.9023288.70  854.3023454.30  855.0023655.50
GR 855.023852.90  854.7024052.90  857.4024106.10  862.3024128.20  861.2024342.70
GR 861.124586.60  861.1024724.20  861.2024934.00  862.0025168.70  862.0025379.90
GR 862.125414.00  860.0025429.50  861.5025453.40  858.6025453.50  860.8025465.30
GR 858.625476.70  862.5025497.50  861.5025767.80  860.0025999.70  859.3026170.70
GR 859.126416.20  859.2026608.30  857.9026761.60  854.4026776.00  853.1026799.60
GR 854.426811.10  852.8026812.10  852.8027038.70  852.8027249.90  852.4027440.10
GR 852.327670.20  852.6027882.60  855.7027917.50  853.5028073.80  855.4028113.80
GR 848.428120.70  850.1028129.50  856.1028138.00  852.6028161.60  853.5028366.50
GR 854.028582.70  854.9028815.80  856.4029043.30  857.6029245.20  860.2029442.30
GR 860.129634.80  860.9029838.40  862.2030042.40  863.2030248.10  864.0030474.70
GR 864.330672.90  864.3030697.00
HD185.10      10
HE185.10

NC0.0650   0.025   0.030    0.10    0.30
X1185.19      9719402.4021051.60  485.00  420.00  477.45
XL                              23969.50
GR 864.517152.90  865.1017275.80  866.6017288.10  865.0017300.00  865.1017356.00
GR 854.317389.60  853.3017480.10  853.8017695.70  849.1017722.70  848.8017794.10
GR 844.017938.90  846.3018239.80  847.7018396.40  850.5018490.30  849.4018588.50
GR 841.418668.90  839.4018799.90  840.9019099.00  847.7019274.10  851.4019323.50
GR 850.519402.40  848.4019430.60  843.8019440.20  844.6019711.90  844.0019796.60
GR 843.620170.00  842.9020591.20  843.2020829.00  843.3020914.90  854.4020956.70
GR 858.321051.60  854.0021364.60  853.9021593.00  850.5021689.90  856.6021953.10
GR 858.022156.50  854.1022214.60  859.3022250.30  858.1022487.60  857.2022537.80
GR 860.322581.00  853.6022603.00  853.0022627.70  845.9022727.90  849.0022976.10
GR 846.823046.10  849.1023088.50  855.6723131.10  855.7023131.30  856.7023429.80
GR 856.623717.30  858.5023944.90  861.8023969.50  854.3023985.80  855.1024248.50
GR 860.824297.70  860.4024545.10  860.6024793.90  861.0025031.90  859.9025049.70
GR 863.125061.50  862.5025148.60  865.1025171.30  859.4025192.30  864.0025220.80
GR 864.825317.60  862.1025327.60  862.2025642.30  860.5025804.40  861.9025994.80
GR 859.426188.80  860.4026550.00  859.3026635.80  856.7026658.30  858.3026961.70
GR 857.827218.60  857.5027509.20  857.1027880.40  856.4027912.70  858.4027919.40
GR 858.627947.40  851.8027957.40  852.8027968.30  857.5027974.50  855.0028003.50
GR 854.828259.80  855.2028531.80  856.2028775.90  857.6029048.40  859.9029287.20
GR 860.829591.40  862.3029828.00  863.0030085.20  863.1030370.00  864.7030580.10
GR 867.030679.20  865.5030697.00
HD185.19      10
HE185.19

NC0.0650   0.025   0.030    0.10    0.30
X1185.28      9719138.5021209.50  490.00  495.00  481.96
XL                        17380.9023024.10
GR 862.617072.30  860.7017182.60  856.4017229.90  859.4017267.20  859.5017315.50
GR 852.617348.20  860.3017380.90  854.7017553.30  854.3017819.10  854.1017842.70
GR 847.517880.20  848.9018151.90  850.1018570.80  851.8018836.60  852.6019138.50
GR 850.519406.50  848.7019426.30  843.9019427.80  846.1019745.60  841.5019838.40
GR 842.020175.10  843.7020466.40  844.8020802.30  845.3020965.70  858.8021034.30
GR 855.221209.50  857.9021367.00  851.8021491.50  855.7021677.50  855.2021740.80
GR 858.221819.30  854.8022100.40  856.0022191.20  853.7022238.80  858.6022318.20
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GR 859.022387.70  852.6022420.30  853.8022465.40  851.0022528.60  846.6022573.30
GR 849.622701.40  847.4022887.70  853.0023005.60  855.7923018.19  857.1023024.10
GR 856.323269.20  856.9023626.10  857.0023763.10  860.2023798.50  854.9023816.30
GR 855.624060.10  855.6024073.00  861.4024095.10  862.2024107.70  859.9024121.30
GR 861.224394.80  861.5024737.50  860.7024999.50  860.4025080.20  862.8025138.80
GR 859.925292.20  863.6025295.80  865.7025300.70  864.7025312.10  859.8025319.50
GR 860.925332.50  866.9025341.60  865.6025362.00  862.5025377.70  862.4025613.50
GR 861.925928.90  860.9026251.80  859.6026484.60  859.4026718.10  858.4026974.40
GR 859.027241.20  858.8027517.10  859.5027764.60  860.9027778.70  854.8027787.90
GR 854.927794.00  859.3027804.00  859.6027822.80  856.9027834.60  859.1028084.40
GR 858.628168.80  856.1028181.00  856.0028426.90  856.2028675.50  857.1028907.80
GR 855.029012.20  860.2029253.30  860.7029503.60  861.9029749.60  862.9029993.00
GR 862.330227.70  864.5030364.00
HD185.28      10
HE185.28

NC0.0650   0.025   0.030    0.10    0.30
X1185.38      9719167.9021198.30  490.00  605.00  498.20
XL                              23138.00
GR 868.117362.80  858.0017377.70  855.2017432.70  855.9017691.20  851.6017917.70
GR 853.418145.40  850.3018250.30  852.9018325.80  848.7018367.30  848.6018656.80
GR 851.618911.50  852.2019167.90  850.7019269.60  849.1019284.20  843.1019304.60
GR 846.919509.20  847.8019605.10  843.8019813.30  843.7019845.50  845.8020606.00
GR 845.920684.50  846.3020936.50  855.2020963.70  857.2021198.30  853.4021271.30
GR 853.921337.10  858.8021468.00  859.6021671.80  855.9021729.30  856.9021940.70
GR 857.122174.20  852.4022259.70  855.5022403.50  851.9022453.20  846.4022492.20
GR 849.722570.70  850.7022834.00  849.1022958.00  856.3223012.09  859.0023032.20
GR 861.023138.00  855.6023227.30  854.0023462.20  855.6023537.80  861.3023614.20
GR 857.723634.30  857.8023886.90  863.0023903.70  861.0023922.20  860.6024129.60
GR 862.724360.40  862.6024614.80  862.0024835.10  862.3024886.20  860.8024891.90
GR 863.124954.60  862.8025155.00  861.2025194.10  866.2025207.00  866.4025219.90
GR 860.325225.10  862.5025241.10  867.3025248.80  867.1025269.50  863.4025294.40
GR 862.625520.70  861.9025839.00  861.8026059.50  860.0026267.70  860.2026470.40
GR 859.826747.70  859.0026974.00  859.4027238.50  859.2027473.20  858.8027540.20
GR 860.927585.40  855.2027594.80  855.0027603.60  860.5027609.50  856.2027667.90
GR 859.327759.50  859.3027975.00  856.1028024.30  856.5028274.00  856.6028514.80
GR 857.828733.00  858.1028969.60  858.7029208.90  859.1029436.00  859.3029647.30
GR 859.429849.80  860.0030068.00  860.5030234.70  863.6030242.80  863.7030458.10
GR 864.030658.30  865.2030868.00
HD185.38      10
HE185.38

NC0.0650   0.025   0.030    0.10    0.30
X1185.46      9718868.8021178.40  490.00  615.00  446.49
XL                              23145.50
GR 871.017150.80  865.6017254.90  866.4017265.40  857.7017284.90  856.4017506.70
GR 857.017775.80  856.0017847.40  851.8017885.70  855.3018131.70  853.7018380.90
GR 853.418608.60  853.3018787.20  848.5018868.80  851.7019077.80  844.2019106.40
GR 846.519327.20  848.8019574.10  848.2019807.30  845.4019854.20  845.5019915.80
GR 845.820183.00  846.0020450.80  846.9020783.00  846.7020917.10  854.5020947.90
GR 855.221178.40  860.2021459.30  860.7021485.40  855.1021587.10  854.9021729.70
GR 858.521852.90  856.9021949.80  858.2022020.60  852.7022110.50  855.2022322.90
GR 853.722384.20  848.8022397.50  850.4022659.30  853.1022874.10  850.6023039.50
GR 855.523067.50  856.8823089.09  860.5023145.50  860.5023282.40  855.0023323.10
GR 855.223374.80  861.7023437.20  857.7023469.40  859.1023726.90  862.2023750.50
GR 861.223996.50  862.8024280.50  862.9024503.10  863.8024721.00  862.5024732.30
GR 865.524754.20  865.5024789.40  862.6024799.00  863.6025028.90  862.5025112.80
GR 868.025134.70  860.3025142.50  862.4025154.00  867.5025163.70  867.4025183.10
GR 863.925201.20  862.7025519.30  862.6025749.00  860.5026027.20  860.5026071.70
GR 862.026081.00  861.1026331.70  860.4026600.20  859.3026825.20  859.4027186.10
GR 860.127408.30  861.1027418.90  856.1027428.30  855.5027433.30  860.8027441.40
GR 858.727718.10  858.9027891.70  857.5028156.30  857.0028464.50  857.2028713.60
GR 857.928942.30  858.5029177.90  858.9029445.50  859.7029665.90  860.1029893.30
GR 860.930053.10  860.0030061.40  862.0030066.00  862.1030300.00  863.7030571.80
GR 865.030792.20  865.0030795.00
HD185.46      10
HE185.46

NC0.0650   0.025   0.030    0.10    0.30
X1185.53      9718779.8021192.80  340.00  285.00  385.26
XL                              23180.10
GR 871.117158.10  870.3017193.90  858.3017209.10  856.3017287.40  856.7017491.40
GR 856.817724.70  857.1017850.10  851.7017879.80  854.3018086.30  856.6018161.40
GR 855.618461.60  854.8018713.00  854.6018779.80  845.0018798.60  847.1019005.00
GR 845.519202.50  849.6019431.00  850.4019632.60  847.5019761.80  849.7019856.00
GR 847.319896.50  850.7019958.90  848.8020004.90  849.4020064.90  846.3020084.40
GR 846.220575.90  846.2020823.10  848.8020942.60  854.2020976.80  856.3021192.80
GR 859.321340.20  857.0021379.10  857.8021579.90  858.0021777.50  859.3021876.60
GR 852.721965.10  855.3022050.30  853.7022163.80  855.3022283.00  851.2022505.70
GR 852.622642.40  850.7022784.50  854.5022922.70  850.7023084.20  857.4423170.43
GR 858.223180.10  858.0023241.90  855.4023272.00  860.5023562.90  861.9023799.20
GR 863.124085.40  864.8024282.40  862.0024473.80  865.5024653.40  862.5024674.20
GR 864.024867.70  863.1024999.30  868.2025015.80  868.3025023.30  860.4025036.00
GR 862.925047.80  868.1025056.50  868.0025070.50  865.2025079.80  863.6025161.10
GR 863.225371.30  863.4025653.60  860.6025904.80  861.2026106.30  861.2026456.40
GR 861.126657.80  860.7026938.80  860.4027150.60  860.4027289.30  855.1027296.00
GR 859.927315.00  859.6027508.20  861.3027598.60  857.0027797.10  857.3027991.60
GR 858.028199.40  858.6028403.80  858.3028598.90  858.1028794.00  857.8028991.70
GR 857.529204.30  857.5029433.80  857.8029628.00  860.1029828.40  860.6029930.50
GR 858.529934.80  862.0029944.10  861.0030157.60  861.2030393.80  862.9030623.70
GR 865.530772.00  864.6030869.00
HD185.53      10
HE185.53

NC0.0650   0.025   0.030    0.10    0.30
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X1185.61       9618602.0021480.50  410.00  405.00  410.24
XL                                24099.60
GR 874.617081.20  864.9017110.50  859.2017139.80  856.4017184.30  856.8017531.50
GR 855.917785.30  856.6017876.00  852.2017926.90  855.8018085.70  856.0018391.20
GR 855.518602.00  845.8018619.20  846.6018829.20  844.9019029.50  848.5019357.60
GR 851.219596.60  850.9019624.40  847.6019648.40  850.2019674.00  850.2019902.30
GR 851.420131.10  846.9020167.50  847.3020399.40  848.5020604.90  849.9020811.30
GR 848.820902.00  847.5020950.80  849.3021031.70  857.1021082.60  859.4021288.20
GR 857.821480.50  861.4021732.80  855.9021821.20  857.5021906.50  854.4022004.90
GR 855.122181.80  851.3022390.20  852.5022607.70  852.0022876.80  851.2022954.10
GR 856.423059.30  855.2023201.90  858.2023211.40  859.0023423.60  861.1023721.70
GR 862.623952.80  863.7024092.10  861.9024099.60  861.5024331.00  863.5024556.60
GR 865.024757.30  863.1024917.10  865.9024993.80  868.9025001.70  870.3025017.10
GR 860.425028.30  864.9025045.30  868.4025050.20  868.3025070.30  864.3025078.10
GR 864.025287.90  863.4025531.40  860.9025762.90  864.0025970.80  861.6026209.50
GR 861.126483.60  861.8026698.20  860.4026906.80  860.7027119.80  862.0027145.80
GR 855.227162.20  861.5027172.20  859.1027218.70  860.3027274.70  858.4027325.70
GR 861.027456.70  860.2027718.00  861.3027993.50  861.0028321.50  860.8028529.80
GR 860.828765.00  861.1029052.20  861.6029266.00  860.9029512.40  860.8029721.80
GR 859.429809.90  861.1029879.30  865.3029889.40  862.6029902.90  863.8029925.00
GR 861.229961.70  860.8030186.30  861.8030419.10  863.2030628.00  864.4030843.90
GR 864.530869.00
HD185.61       10
HE185.61

NC0.0650   0.025   0.030    0.10    0.30
X1185.71       9619065.6021263.90  525.00  525.00  521.31
XL                                22968.60
GR 872.517061.00  861.9017090.50  858.3017163.80  858.0017506.50  856.7017793.40
GR 853.718020.90  855.2018058.50  854.7018172.00  856.8018350.40  861.0018364.50
GR 857.718381.70  855.8018475.70  846.8018494.90  846.8018562.80  849.6018582.90
GR 847.118606.60  852.0018645.90  847.5018700.60  846.8018778.80  849.5018797.80
GR 846.318801.20  850.2018814.00  850.1018880.80  854.7018892.80  854.1018909.00
GR 849.418922.20  852.9018951.70  847.7018982.60  846.0019006.30  850.2019021.60
GR 853.419061.60  855.1019065.60  846.1019101.20  848.1019144.80  846.7019313.40
GR 850.219339.70  848.5019486.90  851.9019556.60  851.2019843.40  854.1020144.40
GR 849.820243.90  848.1020482.90  847.3020772.40  849.2020810.80  846.8020960.60
GR 850.921237.00  856.0021263.90  861.4021588.80  857.1021691.90  860.8021762.60
GR 855.321860.90  858.0022141.00  856.6022230.50  851.2022328.30  852.2022372.30
GR 849.922623.90  852.1022829.80  849.7022920.90  855.5022968.60  859.6023265.80
GR 861.123631.40  862.6023913.50  862.9024204.90  864.1024364.90  862.4024471.70
GR 862.324810.90  864.6024887.20  866.6024910.50  861.2024916.90  866.3024943.20
GR 862.924967.70  862.7025415.40  862.0025800.60  861.6026107.80  860.3026393.50
GR 860.426675.90  862.7026984.60  862.2027001.80  857.0027008.90  856.8027016.40
GR 861.127028.30  860.6027311.00  859.7027656.30  861.2027944.90  860.9028329.90
GR 861.628642.40  862.1028952.60  863.3029239.20  863.6029533.60  862.8029672.30
GR 865.829749.00  866.0030130.70  866.1030429.80  868.0030808.40  868.5031023.90
GR 872.231409.00
HD185.71       10
HE185.71

NC0.0650   0.025   0.030    0.10    0.30
X1185.81       9518982.2021385.90  505.00  650.00  506.15
XL                                23520.00
GR 870.817237.10  859.9017277.10  856.1017316.70  854.4017585.60  853.3017687.00
GR 853.318100.00  856.7018121.10  848.8018246.30  854.0018282.30  853.1018333.10
GR 859.418373.80  856.4018431.80  853.9018753.30  854.6018883.10  851.9018907.70
GR 856.918934.40  857.4018972.50  860.5018982.20  848.9019006.60  846.8019029.00
GR 849.019041.40  846.4019129.50  843.6019138.90  848.0019170.60  848.0019262.10
GR 845.919280.50  847.8019332.80  848.4019631.60  852.2019728.20  851.5020049.40
GR 852.220070.50  855.2020089.60  855.8020160.60  848.5020241.20  848.0020504.90
GR 847.620853.90  850.5020880.30  847.6020934.50  853.4020979.10  851.9021200.30
GR 849.921268.20  850.8021348.00  857.6021385.90  857.3021715.30  855.5021774.20
GR 857.321828.70  852.1021969.90  855.7022168.90  850.5022300.00  850.5022867.00
GR 856.222899.70  857.7022919.80  855.1022958.40  856.2023429.90  857.0023720.00
GR 857.224058.50  861.8024141.60  864.2024232.40  861.2024238.40  861.3024536.80
GR 864.224759.10  868.1024784.30  861.0024792.80  860.7024798.90  866.4024818.40
GR 863.124861.70  863.1025150.10  859.1025194.50  858.8025229.10  863.1025306.50
GR 861.825579.30  861.8025882.60  862.1026220.90  861.4026498.00  860.4026826.70
GR 861.826990.50  862.1027244.00  860.2027246.20  860.5027546.70  861.3027850.30
GR 860.728146.70  863.1028194.80  856.8028199.60  856.4028209.60  863.3028224.50
GR 862.128577.20  862.0028991.10  862.4029328.60  865.9029592.40  864.1029658.90
GR 865.630001.30  866.3030344.20  867.4030617.00  869.1030996.00  869.5031244.80
HD185.81       10
HE185.81

NC0.0650   0.025   0.030    0.10    0.30
X1185.90       9419167.1021277.10  525.00  620.00  521.25
XL                                24082.30
GR 873.117044.90  870.3017288.50  867.3017309.30  856.9017349.00  854.8017719.70
GR 854.518034.70  853.7018235.10  853.7018395.00  853.8018405.00  856.6018467.70
GR 856.418721.10  853.4018857.80  851.1018868.80  855.2018883.80  853.3018886.10
GR 852.718897.20  847.1018918.70  847.7018931.30  845.4018934.60  849.9019075.30
GR 845.719082.60  848.7019116.50  845.3019159.70  851.7019167.10  850.9019203.70
GR 849.019210.40  846.3019212.20  849.9019226.40  849.7019336.20  847.8019569.10
GR 850.319617.90  849.1019785.80  847.3019815.70  850.9020070.40  851.7020184.60
GR 849.520232.90  849.5020640.50  849.7020895.90  852.5020931.00  850.4020957.80
GR 850.621220.30  850.9021255.10  857.4021277.10  856.3021602.70  855.0021891.40
GR 854.921902.00  851.8022160.20  850.5022419.90  850.5022820.00  857.3022863.30
GR 855.823110.30  855.8023357.60  855.5023792.20  856.0024036.00  862.7024082.30
GR 859.824157.70  859.9024494.70  859.2024648.90  863.0024693.70  857.6024702.10
GR 863.424725.20  860.1024757.60  860.2025124.50  859.1025401.90  859.2025820.80
GR 858.626191.50  859.0026436.10  858.3026719.30  858.4026854.60  859.9026873.30
GR 862.526877.80  857.0026952.20  861.7027236.90  864.1027372.50  861.6027400.80
GR 862.227676.10  862.3028004.20  864.8028066.30  858.7028073.00  858.3028081.50
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GR 863.228095.50  863.6028356.80  863.9028629.80  864.7028906.90  864.7029188.00
GR 865.029425.90  865.5029964.50  866.8030032.00  865.5030278.80  867.2030537.40
GR 870.030818.60  871.2031119.40  871.4031183.60  872.9031465.00
HD185.90      10
HE185.90

NC0.0650   0.025   0.030    0.10    0.30
X1186.00      9518924.3020939.00  520.00  520.00  507.87
XL                     17560.0023954.40
GR 871.717007.60  868.1017054.00  867.5017100.80  864.1017165.20  860.5017180.00
GR 858.717410.90  858.0017779.10  854.9018075.80  853.4018320.80  855.0018357.80
GR 848.918396.90  852.9018559.20  858.1018592.80  857.4018603.30  849.7018639.00
GR 850.818743.70  854.1018771.80  854.3018860.20  846.8018905.10  852.3018906.80
GR 856.418924.30  849.7018951.40  848.2018964.40  851.5018972.20  846.9019076.00
GR 849.219152.50  845.8019160.90  848.0019170.60  849.0019258.20  852.1019275.90
GR 849.119524.20  847.5019720.50  851.2019914.70  849.6020178.80  850.5020215.90
GR 849.820583.70  848.7020914.30  852.3020939.00  848.8021037.20  850.1021086.80
GR 856.021108.10  856.6021347.40  855.5021591.60  856.5021780.80  850.1021994.60
GR 853.322253.50  850.5022458.00  850.5022839.00  856.2022869.00  856.6023113.30
GR 856.123378.80  856.3023610.60  856.2023850.80  858.8023931.80  862.3023954.40
GR 860.824195.60  861.6024457.10  861.3024532.20  865.1024571.70  857.4024581.70
GR 864.724621.60  862.2024648.50  861.1024977.40  861.0025298.60  860.0025565.90
GR 859.825861.20  859.8026104.00  859.7026337.60  858.6026587.60  858.5026735.60
GR 860.426773.70  857.5026931.10  862.0027182.80  864.3027260.60  861.3027286.30
GR 861.627522.50  863.3027774.20  862.3027921.10  862.9027952.80  858.9027958.10
GR 858.727966.90  863.7027981.40  862.3028089.20  863.8028328.00  864.7028561.40
GR 864.328807.90  864.6029062.40  863.9029290.60  865.5029372.00  866.2029607.50
GR 866.529945.60  867.7030206.30  868.1030454.50  869.5030711.00  870.5030827.00
HD186.00      10
HE186.00

NC0.0650   0.135   0.030    0.10    0.30
X1186.10      9519438.7020901.20  520.00  500.00  506.66
XL                     17698.5024103.30
GR 871.516805.30  871.6016962.30  869.0017082.50  859.5017184.50  857.7017571.30
GR 858.017671.90  862.0017698.50  859.8017750.30  859.2018003.10  857.7018271.60
GR 858.818575.70  857.8018697.60  856.2018706.60  858.6018712.90  851.0018764.90
GR 850.818783.70  853.7018818.40  853.4018959.60  855.2019038.10  847.9019099.50
GR 846.419155.90  848.1019192.90  850.6019200.10  852.5019232.60  851.7019346.20
GR 853.219438.70  851.4019693.40  848.8019957.00  850.0020218.20  850.5020418.70
GR 851.420781.00  851.7020883.60  861.7020901.20  859.0021019.50  857.1021238.50
GR 858.521437.80  853.5021659.20  853.8021926.50  853.6022173.40  850.5022412.00
GR 850.522604.00  856.4022701.40  857.2022759.40  854.9022814.10  857.0023000.20
GR 858.823084.60  849.2023134.40  852.7023272.40  851.5023277.30  861.0023421.00
GR 860.223675.90  859.8023820.20  861.6024103.30  861.9024395.90  863.1024681.10
GR 863.124960.80  864.0025369.20  865.2025537.70  859.0025545.80  860.1025558.90
GR 865.825567.60  865.0025587.20  862.4025591.60  865.2025615.40  862.8025618.00
GR 861.725891.00  861.1026150.90  860.6026495.00  860.3026770.30  864.5026937.00
GR 863.427246.60  862.0027518.10  862.3027771.30  863.8027827.10  856.7027833.90
GR 864.327862.40  862.1027913.10  861.7028166.80  863.2028499.30  862.3028780.20
GR 862.228834.10  865.4028860.20  862.6028936.40  862.3029179.00  864.7029258.20
GR 860.829272.60  865.0029289.80  864.6029669.80  865.7029960.80  864.8030260.60
GR 867.230492.20  869.9030849.00  870.4031134.30  870.6031398.00  870.7031414.00
HD186.10      10
HE186.10

NC0.0650   0.093   0.030    0.10    0.30
X1186.19      9619388.5020814.70  520.00  500.00  513.30
XL                     17931.7023736.90
GR 869.716703.70  868.3016899.60  866.8017036.30  867.2017153.40  863.6017163.60
GR 864.617364.20  857.7017407.20  856.5017630.70  855.2017827.80  861.5017931.70
GR 860.418142.10  859.2018362.60  860.6018448.20  856.4018485.20  857.7018691.30
GR 856.918787.00  855.0018816.80  854.0019062.40  859.2019091.40  850.2019208.20
GR 851.019366.00  854.0019388.50  852.1019528.10  853.7019718.80  851.1019910.80
GR 848.920040.20  850.8020139.00  851.5020659.30  851.7020796.50  862.6020814.70
GR 856.520876.00  858.9021112.30  855.9021317.50  857.7021466.10  850.5021652.00
GR 850.521830.00  850.7021834.30  850.6022105.30  851.1022320.50  850.7022403.20
GR 858.222594.20  859.4022805.70  860.8022915.20  858.9023027.00  850.9023066.70
GR 854.023129.50  851.1023197.20  853.6023262.70  861.3023290.00  861.3023323.30
GR 859.823329.00  859.9023515.50  859.9023701.60  861.3023956.90  861.3024162.90
GR 862.324391.80  862.0024632.20  863.2024851.20  863.5025044.70  863.6025238.90
GR 865.425423.70  866.1025438.60  860.7025446.20  866.1025483.70  863.6025515.70
GR 864.125700.50  863.3025896.10  862.1026128.70  861.8026376.90  863.2026424.80
GR 860.226472.20  860.8026661.60  861.6026859.00  861.6027048.50  861.5027211.50
GR 861.727428.80  861.2027699.40  861.9027958.90  862.9028228.40  862.6028501.80
GR 862.828793.50  862.1028996.40  862.5029028.90  863.9029053.90  858.9029059.50
GR 865.129087.50  862.5029181.80  864.0029387.80  865.5029691.40  865.8030005.30
GR 866.330217.00  867.3030417.10  868.9030660.30  867.8030924.50  869.4031128.40
GR 869.731332.00
HD186.19      10
HE186.19

NC0.1500   0.116   0.030    0.10    0.30
X1186.27      9619145.5020733.90  395.00  500.00  425.61
XL                     17920.0023606.30
GR 860.117016.70  872.2017192.40  863.8017241.50  862.5017425.70  862.4017439.40
GR 862.017626.10  859.9017895.90  859.3018153.70  861.1018344.60  862.0018366.90
GR 858.018386.70  858.5018632.50  856.4018845.60  856.6019007.00  860.8019128.00
GR 863.019145.50  855.9019181.40  851.1019288.00  851.9019477.60  852.0019679.00
GR 853.319792.10  849.8019960.30  850.2020071.80  852.3020547.40  852.9020709.60
GR 858.820733.90  855.9020745.70  857.8020886.60  857.0021130.40  850.6021264.90
GR 850.921506.50  852.2021713.30  850.4021843.70  849.9021977.00  854.6022046.10
GR 852.522116.30  851.6022252.30  857.6022433.50  860.8022476.80  858.8022608.60
GR 859.122800.20  861.1022994.90  862.8023025.40  852.6023045.60  851.1023115.90
GR 854.423232.40  862.8023274.00  860.9023462.80  859.2023606.30  862.1023690.50
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GR 861.823945.50  862.1024176.20  862.2024455.20  862.9024710.10  863.1024970.00
GR 863.825163.90  863.4025355.20  866.5025398.50  860.0025409.70  868.5025436.70
GR 869.025443.70  863.8025453.50  864.3025712.50  864.1025946.00  863.5026165.90
GR 863.926330.30  860.7026337.10  861.0026556.30  861.8026827.10  861.9027053.10
GR 862.827342.80  862.3027528.70  862.6027814.80  862.9028049.20  863.2028317.70
GR 863.628573.20  863.7028814.40  864.4028930.50  866.1028948.40  860.7028961.40
GR 865.529011.10  865.3029286.80  865.5029346.40  865.6029586.30  865.6029640.30
GR 866.629875.30  866.7030069.90  866.4030261.50  868.4030303.80  866.0030322.10
GR 868.030459.20  867.6030714.10  867.6030725.10  868.5030946.90  868.5030956.30
GR 869.231146.30
HD186.27      10
HE186.27

NC0.1500   0.120   0.030    0.10    0.30
X1186.36      9619209.2020687.50  450.00  385.00  470.98
XL                     17900.0023564.20
GR 866.716815.10  864.1016885.90  864.3016935.40  874.3016962.20  875.4016983.00
GR 864.917021.20  863.3017384.50  861.9017653.30  861.3017907.90  860.5018199.60
GR 863.018274.10  858.6018302.40  857.8018618.10  857.5018851.80  856.8018914.60
GR 860.518994.30  863.2019144.20  862.1019200.60  864.2019209.20  858.6019215.00
GR 852.219260.10  851.4019373.20  855.1019393.90  853.4019570.60  854.5019619.60
GR 850.219662.00  851.9019898.50  851.9019960.90  852.4020473.00  852.7020657.50
GR 857.720678.90  861.6020687.50  862.6020846.90  861.3020871.10  853.7020928.00
GR 849.221150.40  853.2021384.60  851.1021468.20  853.8021697.80  853.6021949.90
GR 852.422133.60  860.5022369.40  859.1022644.80  857.4022877.90  858.0022950.70
GR 851.123002.00  851.1023131.00  855.1023180.60  862.6023222.00  861.1023466.70
GR 860.023515.60  863.8023564.20  861.8023652.30  863.6024056.10  863.6024109.50
GR 863.324345.80  863.4024374.80  863.4024642.70  863.0024900.70  863.0025195.40
GR 863.525446.50  868.2025519.30  861.1025529.70  861.0025537.00  866.9025558.80
GR 867.625577.90  863.6025595.70  862.9025835.20  862.5026123.30  864.0026247.30
GR 861.326253.10  861.8026490.70  862.9026768.30  862.6027007.10  862.4027054.00
GR 863.027314.00  863.4027544.40  864.0027790.70  863.9028058.50  864.3028309.20
GR 864.128545.40  863.8028813.20  866.2028861.60  861.7028874.10  866.3029250.50
GR 866.329549.50  867.3029830.90  868.2030091.50  865.2030192.70  869.2030225.20
GR 869.430465.30  869.2030702.30  870.3030948.20  870.9031189.70  872.5031438.40
GR 873.431628.50
HD186.36      10
HE186.36

NC0.1500   0.126   0.030    0.10    0.30
X1186.46      9719243.7020609.30  475.00  460.00  494.75
XL                            23502.30
GR 872.515785.10  871.0016067.10  870.3016286.00  869.4016498.20  867.6016746.60
GR 866.217152.20  864.9017370.80  869.2017587.90  872.6017639.70  869.3017866.70
GR 866.117921.20  862.1017937.40  863.6017984.80  860.5518200.00  860.4018210.90
GR 859.718547.40  859.3018768.80  860.9018991.00  863.1019059.50  857.4019122.10
GR 859.119243.70  853.6019258.10  852.0019308.10  854.1019410.80  852.5019599.00
GR 853.419690.60  850.9019716.80  852.2019909.80  853.3020554.90  853.3020590.70
GR 864.020609.30  859.4020631.50  861.2020633.60  858.4020647.60  856.3020691.20
GR 854.720694.50  849.9020784.60  852.3021022.40  853.3021127.80  850.7021299.70
GR 852.521518.50  851.4021718.40  854.6021794.00  856.5021991.10  863.6022181.40
GR 860.922262.60  862.0022407.60  860.1022624.90  855.8022867.00  855.1022954.40
GR 851.122973.00  851.1023071.00  856.4023147.00  863.2023177.00  860.8023307.10
GR 862.523310.60  863.9023502.30  864.4023825.50  864.3024046.20  864.5024267.70
GR 864.224510.50  863.2024739.60  863.4025066.60  863.9025317.10  863.4025602.80
GR 864.225657.40  868.4025710.00  861.2025717.60  861.1025729.90  868.0025742.80
GR 868.225771.70  863.6025784.20  863.1026094.90  864.3026149.90  862.5026372.00
GR 862.226612.80  862.9026865.50  862.8027106.30  863.3027400.50  864.0027688.70
GR 864.027772.40  863.6027984.80  863.7028028.40  864.6028351.30  864.6028360.90
GR 864.928584.80  866.5028768.90  861.8028777.30  866.8028825.40  865.5029052.30
GR 866.829361.00  868.1029672.70  868.2029939.00  868.9030156.10  869.8030529.80
GR 869.830828.80  870.4031063.60
HD186.46      10
HE186.46

NC0.1500   0.121   0.030    0.10    0.30
X1186.55      9619271.4020567.50  475.00  675.00  489.65
XL                            23343.30
GR 868.518001.20  867.9018093.90  874.6018112.10  863.7018128.80  860.2018254.10
GR 859.118496.10  859.4018711.80  859.2018955.90  861.7019127.10  856.8019240.30
GR 859.619271.40  852.9019288.60  856.0019432.70  851.1019480.50  852.1019686.90
GR 854.419882.40  852.7019928.60  853.3019966.20  850.0019979.80  851.7020250.30
GR 853.720532.70  863.1020567.50  855.4020647.30  852.5020705.70  853.6020733.20
GR 852.020769.30  854.8020879.20  853.3021084.90  857.9021116.30  852.4021202.60
GR 859.721282.70  857.4021348.40  858.7021387.20  855.3021622.20  853.5021735.80
GR 861.121951.30  857.8022155.80  862.7022293.90  861.7022462.00  862.9022478.70
GR 853.922614.30  853.0022677.00  857.1022818.30  854.7022871.40  856.1022965.90
GR 853.423019.20  853.7023066.90  851.6023084.10  856.0023118.70  861.8023131.00
GR 861.423316.70  864.7023343.30  864.2023433.40  863.9023640.80  865.1023849.40
GR 865.123856.00  864.6024264.20  864.5024380.70  864.2024719.40  864.7025011.80
GR 864.925305.00  864.7025551.00  864.5025843.90  866.4026007.80  870.0026039.60
GR 861.326050.20  862.2026062.40  869.6026071.90  870.0026091.80  862.6026149.40
GR 863.926510.90  864.1026812.80  863.9027100.50  864.2027301.90  864.4027621.80
GR 864.327830.70  864.4028072.80  864.4028305.70  864.3028567.60  865.1028626.20
GR 867.328650.50  863.0028660.20  866.5028672.50  864.4028794.30  866.6028993.80
GR 866.729053.10  867.0029395.20  867.1029440.40  867.9029700.10  868.4029931.50
GR 867.730173.60  869.0030377.80  869.0030627.10  869.6030879.80  870.4031084.20
GR 872.231174.20
HD186.55      10
HE186.55

NC0.1500   0.150   0.030    0.10    0.30
X1186.61      9719285.9020541.70  295.00  220.00  290.56
XL                     18224.9023346.00
GR 872.517706.60  868.9017962.40  865.0018178.90  867.3018224.90  865.4718241.60
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GR 861.818275.10  861.5018558.10  863.1018649.20  860.2018750.70  856.8018802.10
GR 861.818993.60  862.1019076.00  854.9019255.10  857.9019285.90  852.6019303.20
GR 852.519608.20  853.8019719.20  856.9019747.80  853.3019782.80  853.7019919.50
GR 849.619946.70  853.5020429.60  853.7020482.50  862.3020541.70  855.8020757.50
GR 853.120927.90  863.1021015.30  864.9021085.00  852.9021182.70  862.0021265.90
GR 863.921495.70  859.0021636.70  865.0021735.60  863.3021803.70  855.4021915.70
GR 860.522097.60  866.0022386.10  867.0022486.60  859.1022554.70  858.3022614.20
GR 855.522658.80  860.1022915.20  859.8022956.20  856.4023054.10  860.1023066.40
GR 857.223071.40  857.3023093.80  861.1023108.60  859.5023140.60  865.8023299.40
GR 864.023325.10  867.5023346.00  866.7023725.70  868.0023943.00  866.4023952.30
GR 867.224204.40  866.0024602.10  867.0024649.30  864.8024656.30  866.3024925.30
GR 866.525273.50  865.4025525.80  866.2025806.40  866.8026027.80  868.0026046.00
GR 863.126050.30  862.6026059.90  868.0026083.30  867.7026101.60  864.5026112.10
GR 864.626414.90  865.1026683.90  865.7026958.30  865.8027163.40  867.6027231.50
GR 858.327253.00  867.2027277.10  866.6027297.60  868.4027301.50  865.6027321.80
GR 865.327574.60  865.6027818.30  865.7028163.60  865.5028418.20  867.6028590.90
GR 863.228599.60  866.2028612.10  866.3029008.60  866.5029061.60  866.2029385.10
GR 866.529629.60  868.0029884.20  868.8030210.70  868.4030503.60  869.7030848.40
GR 872.031091.60  872.0031110.50
HD186.61      10
HE186.61

NC0.1500   0.150   0.030    0.10    0.30
X1186.69      9619175.5020398.10  420.00  480.00  455.31
XL                                23207.00
GR 877.118198.80  862.0018253.90  862.0018500.00  860.7018688.00  857.8018765.50
GR 860.918904.50  858.0018922.10  856.5018995.10  860.6019015.70  864.8019175.50
GR 862.219210.30  854.5019233.40  854.1019529.60  853.4019769.00  853.1019826.70
GR 850.519864.30  853.0020143.80  855.0020369.80  866.1020398.10  856.1020432.30
GR 857.220695.70  857.1020782.70  866.7020974.50  866.1021128.70  854.3021245.10
GR 863.621313.40  861.7021418.20  862.8021625.20  859.8021801.00  856.1021906.40
GR 863.522023.00  860.2022072.30  862.7022169.80  860.5022424.40  867.4022547.60
GR 860.222667.00  857.4022818.70  856.6023028.00  856.2023039.80  863.8023081.40
GR 865.423190.80  866.7023207.00  864.7023232.20  867.2023255.40  866.0023307.20
GR 865.923553.40  866.7023810.50  867.1024112.10  867.3024337.80  867.0024545.00
GR 864.924561.10  866.5024833.80  866.5024916.90  866.4025142.00  865.5025355.80
GR 866.025628.20  866.0025862.40  868.8026070.00  868.7026074.90  863.0026080.20
GR 863.226087.40  869.1026106.90  868.2026130.30  864.3026148.90  865.0026286.50
GR 864.626510.10  864.5026547.90  865.3026822.70  863.5027069.00  865.7027130.40
GR 857.727148.50  867.5027176.90  867.4027202.80  865.3027204.90  865.0027479.30
GR 865.727700.50  865.4027932.50  865.4028268.00  866.4028481.00  866.8028490.10
GR 863.028501.20  866.6028523.00  866.1028762.60  866.5028921.40  866.6029175.50
GR 866.829259.60  867.7029515.30  867.2029768.50  867.7029889.40  868.1030126.70
GR 868.030443.70  868.6030722.30  870.4030945.20  871.3031162.60  872.9031372.50
GR 873.731600.90
HD186.69      10
HE186.69

NC0.1500   0.150   0.030    0.10    0.30
X1186.78      9619001.7020350.60  460.00  500.00  460.85
XL                                23155.00
GR 883.718267.80  882.2018275.50  865.7018316.60  862.8018388.50  861.8018576.80
GR 859.818620.40  860.1018684.60  857.9018701.50  858.0018772.50  863.0018797.90
GR 863.418865.50  856.5018895.30  859.5018941.70  859.8018965.80  865.8019001.70
GR 863.919053.40  855.4019076.70  854.0019354.10  854.1019451.90  856.6019479.90
GR 851.719635.40  853.6019929.60  855.9020206.90  855.2020230.10  857.2020258.50
GR 853.920272.20  853.9020297.80  866.3020350.60  856.5020444.60  858.9020517.20
GR 857.220545.80  864.8020913.60  863.6021055.00  855.2021199.30  865.0021274.50
GR 860.021350.20  862.1021612.00  858.5021670.60  857.7021847.90  866.7022049.20
GR 869.822200.30  863.4022348.80  865.5022620.90  855.8022817.40  858.1022910.60
GR 865.122940.80  865.9023146.30  868.7023155.00  866.6023232.90  866.8023542.60
GR 868.923760.80  867.9023770.60  869.7023774.20  868.0023833.90  868.1024141.70
GR 868.324418.20  867.1024426.30  869.2024461.80  866.0024471.30  866.8024804.00
GR 866.825091.60  866.0025371.10  866.8025728.70  863.8025977.80  864.9026019.30
GR 868.626039.70  863.0026046.40  863.6026057.20  868.3026071.40  868.3026094.30
GR 864.726112.10  864.8026459.60  864.1026794.80  864.9027033.30  856.9027054.30
GR 867.527079.70  864.6027157.10  865.2027579.30  864.7027865.90  865.5028219.40
GR 865.628390.80  864.1028401.10  864.8028590.70  863.3028653.70  867.4028978.40
GR 866.129303.90  866.2029608.30  867.0029902.70  867.4030224.80  868.5030566.30
GR 868.430873.80  870.7031087.80  869.0031107.60  870.4031395.40  874.3031643.40
GR 873.931832.00
HD186.78      10
HE186.78

NC0.0650   0.025   0.030    0.10    0.30
X1186.87      9618852.8020400.00  500.00  440.00  494.14
XL                                23052.20
GR 876.518052.90  871.3018194.50  863.7018248.30  863.3018267.80  866.1018303.00
GR 859.318577.80  861.6018691.20  863.1018700.20  859.0018732.10  865.2018852.80
GR 862.918908.80  856.0018929.70  853.8019249.00  852.7019445.30  857.6019456.10
GR 859.919524.60  852.6019616.40  854.2019890.40  854.0020088.80  856.2020124.70
GR 858.520280.70  857.8020382.10  859.7020400.00  858.9020443.00  860.4020573.50
GR 855.320709.20  865.7020845.80  868.4021062.40  862.2021231.20  862.7021295.90
GR 861.021330.90  863.6021366.90  856.8021416.90  860.5021510.30  873.5021569.00
GR 874.221605.40  871.4021610.00  871.7021612.80  862.8021632.80  860.0021655.60
GR 862.921918.20  864.5022271.40  864.1022481.10  865.9022703.60  866.8022978.50
GR 866.123040.50  869.2023052.60  867.6023151.10  868.4023489.00  868.0023648.20
GR 869.423951.30  868.9024254.00  869.7024318.80  868.2024328.20  869.4024366.70
GR 866.824372.40  868.6024383.50  868.4024663.70  867.8024987.50  866.4025244.50
GR 867.325530.60  865.9025781.10  866.4025961.30  869.4025979.90  862.9025985.10
GR 864.726000.90  869.1026014.70  868.9026035.60  865.9026052.50  865.6026312.70
GR 865.526340.50  864.0026644.80  865.0026925.40  855.9026944.30  866.4026970.00
GR 867.326993.20  865.0027015.30  864.5027470.20  864.9027751.30  864.9028035.30
GR 864.628289.90  866.7028373.20  864.6028397.80  864.7028663.20  865.7028982.80
GR 865.929261.90  865.8029516.50  865.1029689.60  866.8029984.50  867.8030320.00
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GR 868.330663.20  868.1030946.10  869.9031212.30  871.4031607.30  874.5031863.80
GR 874.231916.00
HD186.87      10
HE186.87

NC0.0650   0.025   0.030    0.10    0.30
X1186.97      9618859.1020397.90  480.00  595.00  487.74
XL                      18218.2022971.20
GR 876.117703.70  874.1017935.80  867.1018118.30  867.5018218.20  864.0018239.60
GR 863.418467.00  863.7018711.50  861.3018859.10  856.3018893.50  853.4019200.80
GR 854.219248.70  857.1019275.10  857.0019412.80  860.7019490.40  853.0019525.60
GR 852.319907.00  851.9019928.00  858.6019961.20  855.3020003.20  858.5020066.40
GR 853.320144.70  857.7020163.80  855.8020283.40  857.1020354.60  863.6020397.90
GR 861.320539.20  854.0020696.70  866.0020772.20  869.2021016.20  864.1021239.80
GR 858.321274.40  862.8021465.10  876.0021504.10  861.3021600.00  860.8021936.90
GR 861.022028.90  860.9022284.20  862.2022521.60  866.3022790.80  867.9022971.20
GR 867.722982.00  871.0022992.50  869.2023037.10  868.6023225.80  870.3023320.10
GR 869.323563.90  868.3023610.00  868.4023862.70  870.8024031.00  869.2024262.00
GR 868.124529.70  867.6024852.40  866.5025085.90  866.2025361.30  866.0025586.60
GR 866.225802.50  867.4025964.80  870.2025984.00  864.7025988.40  864.2025999.70
GR 869.926017.30  869.3026031.70  866.2026085.80  867.1026338.80  867.1026425.60
GR 867.226680.80  867.8026855.40  856.7026877.00  869.3026902.70  868.6026924.20
GR 866.826928.80  866.8027225.80  866.8027568.50  867.8027790.30  869.5028043.30
GR 866.428228.70  868.3028281.90  866.5028305.20  867.7028524.50  868.3028767.40
GR 868.629027.40  867.6029055.00  869.2029270.80  870.1029643.00  869.9029861.60
GR 870.630077.20  870.2030381.70  871.6030626.60  871.5030686.00  871.5030883.60
GR 872.530898.50  869.3030916.70  871.2031134.80  872.3031489.50  873.6031774.40
GR 874.332015.00
HD186.97      10
HE186.97

NC0.0650   0.025   0.030    0.10    0.30
X1187.06      9818915.2020600.60  495.00  445.00  491.11
XL                            24028.00
GR 871.418210.80  875.3018290.60  871.0018352.90  869.1318358.98  866.5018367.50
GR 862.118403.50  864.9018448.70  862.5018553.80  862.9018764.60  865.2018814.50
GR 861.918856.30  863.6018915.20  856.8018958.50  853.6019169.60  853.5019224.30
GR 858.819406.80  856.9019472.70  854.5019487.60  854.1019545.30  852.6019862.70
GR 851.919941.30  859.6020131.20  855.8020160.10  855.5020219.30  862.9020266.60
GR 857.620298.40  860.6020347.80  856.7020462.40  857.0020556.60  861.7020600.60
GR 862.520810.80  862.4021041.50  861.0021268.30  865.8021319.20  858.8021522.60
GR 859.621542.00  863.6021640.90  862.6021801.30  860.8021842.60  868.5021892.00
GR 866.022116.50  864.0022357.00  866.4022637.80  867.9022907.50  868.3022980.30
GR 871.022991.10  869.8023214.50  871.2023431.80  871.3023596.30  871.5023861.30
GR 871.724028.00  869.7024241.00  870.2024300.50  868.0024305.70  869.7024518.80
GR 868.824783.50  868.9025120.40  868.7025481.80  870.0025743.30  870.3025962.30
GR 870.226012.70  865.3026031.80  870.1026043.70  869.6026062.10  867.3026070.80
GR 868.526286.80  868.1026545.60  867.8026770.30  868.9026875.60  866.8026889.20
GR 867.527011.80  867.8027223.30  868.2027475.20  869.2027696.50  869.0027869.20
GR 867.127906.80  868.7028134.90  869.9028180.40  867.8028193.20  869.5028204.30
GR 868.428419.00  868.0028648.80  868.5028878.90  868.5029180.10  869.2029403.70
GR 867.829538.30  866.0029551.80  869.8029590.00  870.5029861.00  870.3030119.20
GR 869.430420.50  869.5030723.80  871.0030940.50  873.0031333.40  872.9031421.40
GR 873.431652.90  874.1031941.80  874.9032114.90
HD187.06      10
HE187.06

NC0.0650   0.030   0.030    0.10    0.30
X1187.15      9718914.9020612.00  495.00  500.00  501.33
XL                            22912.40
GR 878.918115.20  875.2018172.50  871.9018194.20  875.6018357.10  867.1018397.90
GR 863.418539.90  867.9018619.00  865.7018646.10  868.7018686.60  863.4018760.40
GR 862.918803.30  865.7018914.90  864.3018938.00  858.1018965.70  855.7019020.50
GR 853.519330.40  854.8019548.10  853.2019821.90  861.8019855.50  854.9020059.30
GR 854.520223.20  862.2020245.10  862.2020287.40  864.6020325.40  864.0020352.00
GR 857.020378.00  860.6020587.90  863.6020612.00  861.1020868.50  865.5021139.20
GR 861.021390.00  861.5021428.50  864.2021438.50  859.5021482.40  860.4621500.00
GR 865.021582.90  863.5021592.80  865.2021721.30  868.7021744.90  865.3021788.70
GR 861.721805.10  862.1022060.10  865.7022351.90  868.2022690.00  869.8022912.40
GR 867.022958.30  871.9022972.50  870.3023275.40  870.1023563.10  869.9023877.60
GR 869.923909.30  866.6023932.30  873.1023964.10  871.6023971.00  866.4023981.10
GR 866.923992.00  872.3024000.50  871.5024012.60  866.3024026.90  869.3024079.60
GR 870.224364.30  870.4024626.60  869.5024923.10  868.7025198.40  868.7025474.60
GR 868.125768.40  867.5026033.10  868.3026391.00  868.4026560.80  867.7026862.50
GR 867.826909.70  868.6027284.70  868.7027299.80  870.2027589.50  870.2027618.40
GR 868.927915.40  869.1028166.00  870.7028181.20  867.8028186.20  870.1028473.80
GR 870.328850.90  870.9029153.60  870.5029423.20  868.1029519.60  865.7029531.10
GR 870.429557.10  869.3029894.00  869.1030194.30  869.5030471.80  869.4030815.60
GR 871.831089.00  871.9031091.10  872.8031351.90  872.8031385.00  873.5031676.00
GR 874.031949.90  874.2032128.20
HD187.15      10
HE187.15

NC0.0650   0.038   0.030    0.10    0.30
X1187.24      9618963.0020647.70  475.00  515.00  481.03
XL                            22819.60
GR 876.918406.80  865.1018516.70  867.2018772.20  865.8018840.00  867.1018963.00
GR 856.819039.00  856.7019450.80  856.4019588.60  854.9019589.30  861.0019607.50
GR 857.119645.60  853.8019656.20  855.8019660.80  854.2019821.30  860.8019847.20
GR 855.820057.60  865.1020088.00  865.0020241.90  859.7020306.50  860.3020357.20
GR 856.320378.20  857.7020585.80  860.0020629.30  863.0020647.70  858.6020680.50
GR 864.320772.60  862.4020850.30  862.9020971.00  861.7021060.10  862.9021142.90
GR 859.921274.30  869.5021369.30  864.7021552.80  865.0021874.00  865.8022108.00
GR 867.322329.50  868.9022552.90  870.9022819.60  869.1022982.20  871.8022992.10
GR 869.623020.70  871.0023250.90  871.1023471.70  870.3023678.20  870.3023956.10
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GR 868.824102.50  873.7024121.50  871.6024128.80  866.3024136.70  866.0024149.90
GR 873.024161.30  872.9024173.40  868.6024188.50  870.6024243.20  870.6024549.20
GR 870.624562.00  870.5024778.00  870.4024795.30  870.1025022.70  869.9025294.80
GR 869.425521.20  869.2025867.40  869.2025896.30  869.6026202.60  869.4026401.20
GR 868.926685.90  868.9026975.40  869.2027289.90  869.8027525.90  870.1027615.80
GR 869.927875.60  870.2028154.30  870.0028187.30  871.9028196.20  868.4028204.80
GR 871.728251.10  868.2028304.80  869.0028528.10  871.3028778.40  870.8029056.50
GR 869.829296.60  870.7029524.40  869.1029538.30  865.4029548.50  870.1029568.70
GR 868.029593.90  869.2029827.90  869.3030109.80  870.1030429.10  869.0030667.10
GR 869.030877.80  871.0030915.20  871.5031156.80  873.1031363.00  873.6031634.50
GR 874.031822.00
HD187.24      10
HE187.24

NC0.0650   0.025   0.030    0.10    0.30
X1187.36      9618951.6020909.50  590.00  690.00  610.00
XL                      18340.0022705.00
GR 877.917063.30  874.3017372.90  873.1017627.40  873.7017699.50  873.2017751.10
GR 870.617805.60  870.1017998.10  867.2018249.40  868.1018497.80  864.5018748.10
GR 868.518951.60  862.5018981.10  862.9019047.60  856.6019077.30  856.6019648.50
GR 856.919732.20  854.8019741.30  853.7019804.90  859.4019859.90  860.2019928.20
GR 856.119969.40  859.2020216.70  862.2020292.70  861.0020437.00  865.7020472.90
GR 859.020517.90  859.8020895.30  866.5020909.50  863.6021202.70  863.9021384.80
GR 865.421393.70  865.6021410.60  863.6021421.60  866.0021674.60  866.2021913.60
GR 866.022208.90  865.0022459.00  865.1022493.40  867.2022516.30  867.5022693.90
GR 871.122705.00  869.2022945.60  871.1023032.20  874.5023040.50  869.3023101.50
GR 870.723498.70  870.5023733.80  869.6023967.10  869.5024212.60  871.7024274.30
GR 873.824303.50  867.2024315.80  868.7024330.00  872.7024334.60  873.0024350.90
GR 869.624364.90  868.9024388.80  870.5024623.70  870.6024898.80  869.7025337.30
GR 869.225625.10  870.3025892.60  869.8026176.30  870.0026428.70  869.9026701.50
GR 869.826969.30  869.8027033.10  871.0027328.90  871.3027637.10  871.3027645.20
GR 870.527914.30  871.5028152.00  870.6028509.70  871.8028846.00  872.0029176.80
GR 872.429463.20  871.3029579.00  867.1029598.40  871.3029606.80  872.7029854.70
GR 872.729895.70  872.4030171.80  872.9030344.30  872.8030642.80  873.1030880.20
GR 871.630926.90  870.0030937.10  872.6030983.80  873.1031227.60  873.4031523.80
GR 874.431879.20  875.5032147.50  877.5032480.50  877.6032518.40  878.4032780.90
GR 878.532784.70
HD187.36      10
HE187.36

NC0.0380   0.025   0.030    0.10    0.30
X1187.45      9619030.1020881.00  495.00  480.00  500.61
XL                      18340.0023094.10
GR 879.417315.30  873.9017578.60  873.8017848.50  874.8017936.10  869.6018125.20
GR 871.018151.90  864.4018459.00  864.4018742.00  865.7018778.80  858.7018844.50
GR 856.218892.40  862.0018962.70  857.7019016.00  860.8019030.10  860.0019045.80
GR 864.619068.60  857.2019095.80  856.9019300.10  856.3019676.20  857.1019698.80
GR 855.319707.40  868.3019746.90  866.5019881.50  859.5019917.30  855.3019971.10
GR 857.920100.90  861.4020116.60  862.3020283.40  858.6020322.60  862.3020399.90
GR 865.220415.90  859.2020460.40  861.9020473.10  859.3020487.20  859.2020510.20
GR 861.920529.40  859.7020542.40  860.7020823.40  861.1020861.90  865.2020881.00
GR 867.121040.00  864.1021191.60  863.9021434.90  865.7921736.50  866.1021786.50
GR 866.022091.40  865.4022353.60  864.7022530.20  868.0022549.90  866.2022728.10
GR 869.822741.70  868.9022992.00  872.4023094.10  872.0023468.90  871.8023745.80
GR 871.724192.50  870.6024323.30  872.7024338.50  867.3024347.80  868.0024362.10
GR 873.024370.10  872.1024381.90  876.2024406.30  869.0024418.40  871.5024492.00
GR 870.724969.90  870.8025231.50  870.4025521.10  871.0025803.10  870.2026192.10
GR 870.826569.50  869.9026883.00  871.0027146.10  871.0027468.50  871.2027747.30
GR 871.428032.10  871.0028293.40  871.4028675.80  871.3028971.80  872.0029306.60
GR 871.729571.60  871.3029614.20  866.4029623.30  871.3029638.50  872.6029931.40
GR 872.330324.50  872.8030625.60  873.3030896.60  872.7031247.40  873.6031541.20
GR 874.731841.80  875.5032127.80  875.4032289.80  876.8032322.50  878.6032706.40
GR 879.232898.90
HD187.45      10
HE187.45

NC0.0300   0.025   0.030    0.10    0.30
X1187.54      9919070.0020898.10  445.00  420.00  444.68
XL                      18560.0023134.70
GR 877.916484.80  875.2016720.40  874.0016962.70  873.4017132.80  869.1017191.80
GR 872.317315.90  868.9017515.60  866.5017555.70  876.6017670.10  874.6017919.10
GR 873.918157.50  872.9018409.30  872.7018661.30  870.7018902.80  866.8219070.00
GR 866.119100.90  857.4019135.10  857.8019373.10  858.1019665.00  857.5019679.20
GR 867.219716.30  865.5019783.70  863.2019797.30  865.4019949.80  858.6020027.40
GR 855.920171.30  860.7020187.20  863.7020276.40  859.2020365.50  860.0020599.80
GR 860.320870.00  861.7020894.30  865.8020898.10  865.0020919.50  867.3020942.20
GR 864.921114.00  865.2021415.40  863.5021438.80  864.7021455.90  865.8921770.00
GR 866.121820.00  866.4021904.10  865.7022202.10  865.2022472.70  865.1022562.50
GR 867.622606.90  867.9022875.30  870.0023072.20  872.5023134.70  872.1023396.40
GR 872.123673.70  871.8023978.20  872.0024256.80  870.1024351.60  874.2024376.60
GR 867.424387.10  868.2024397.40  873.4024408.90  873.4024423.90  869.9024431.10
GR 871.924542.50  871.7024896.10  871.3025235.40  871.2025484.50  871.5025758.30
GR 870.426027.80  870.9026298.10  871.1026317.80  871.5026556.90  871.4026598.50
GR 871.126870.30  871.0026906.20  871.1027168.50  871.1027308.10  871.8027564.20
GR 871.527817.00  871.8028080.30  871.5028316.00  871.3028704.40  871.1028988.10
GR 871.729265.00  872.2029570.10  872.0029642.70  866.7029654.10  871.6029677.10
GR 872.629926.00  872.5030215.40  872.7030569.50  873.4030823.40  872.8031078.70
GR 873.931261.50  874.2031547.90  874.3031603.20  874.8031873.60  874.9031903.50
GR 876.532162.00  877.0032410.60  877.2032706.90  877.3032735.30
HD187.54      10
HE187.54

NC0.0650   0.025   0.030    0.10    0.30
X1187.64      9619149.8020811.50  510.00  105.00  513.43
XL                      18600.0023100.00
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GR 878.617435.00  877.0017689.20  874.2017936.00  871.3018206.40  872.4018235.00
GR 869.218474.60  867.9018698.60  866.3018932.10  866.7019149.80  857.5019181.50
GR 857.419335.00  858.1019700.70  865.4019752.40  859.8019814.20  867.1019887.20
GR 864.619903.10  862.1020007.70  866.1020056.60  863.5020138.70  858.9020171.40
GR 858.720209.70  856.1020219.00  856.9020288.30  861.8020309.70  864.0020379.30
GR 858.220407.70  860.6020798.80  867.2020811.50  864.8020961.20  866.4021264.70
GR 861.321306.90  863.0021386.20  861.5021444.10  863.5021475.90  863.1021553.30
GR 868.121594.20  867.8021882.50  865.1022187.50  868.1022291.10  866.0022317.10
GR 865.622627.90  866.8022872.90  868.5023093.20  870.2023155.10  872.6023272.70
GR 871.923393.20  872.6023658.20  872.1023900.40  873.5024164.00  871.7024436.50
GR 870.524440.70  873.4024451.20  874.3024470.70  867.5024482.90  867.4024491.30
GR 874.224503.90  871.5024722.10  870.7025001.20  871.1025242.10  871.4025486.90
GR 871.025759.80  870.6025918.90  872.6026089.00  871.9026333.70  872.5026572.20
GR 873.226808.30  872.9027069.20  872.0027289.90  872.5027601.30  872.5027832.60
GR 872.628078.80  873.5028296.70  870.8028515.60  871.3028780.90  871.3028784.30
GR 871.129024.40  871.1029047.10  871.4029303.80  872.1029530.70  872.6029733.30
GR 867.029743.40  871.4029765.40  872.7030055.60  872.4030381.80  872.7030598.20
GR 873.230858.70  873.3031077.70  873.8031366.40  873.9031447.10  874.6031696.40
GR 875.631916.30  876.6032225.30  877.4032532.30  877.4032561.90  877.8032820.60
GR 877.832822.90
HD187.64      10
HE187.64

NC0.0650   0.025   0.030    0.10    0.30
X1187.73      9719064.3020707.90  490.00  280.00  474.38
XL                      18800.0023450.00
GR 880.217304.30  877.6017535.00  877.0017680.20  879.2017706.80  875.7017828.60
GR 874.318074.00  874.9018329.80  873.3018553.60  873.9018646.50  869.4018784.70
GR 866.018836.30  869.0018944.40  868.1018980.60  870.9019064.30  869.3019070.10
GR 869.019109.60  860.6019133.50  863.0019148.60  858.6019162.90  858.2019568.60
GR 859.219658.30  855.4019748.30  858.1019823.00  862.0019846.80  864.6019892.80
GR 866.220038.40  866.7020206.80  858.1020249.30  860.4020358.40  856.1020380.90
GR 857.020432.10  860.9020679.30  865.4020707.90  866.8020982.30  867.5021196.00
GR 867.821229.50  865.3021339.70  869.5021556.20  868.6021640.80  869.6321682.00
GR 870.921732.40  870.2021985.20  867.7022286.30  866.5022533.00  866.4022757.70
GR 865.622970.70  865.0023038.60  870.8023091.20  870.5023302.00  870.9023529.00
GR 871.723862.30  871.9024081.20  872.8024335.70  874.0024455.80  867.4024464.80
GR 866.924474.10  874.3024488.20  872.5024869.80  872.5024873.80  872.5025101.20
GR 873.125305.50  873.2025557.70  873.5025769.20  870.7025779.80  872.5026047.50
GR 872.026195.50  872.7026423.70  872.5026680.60  871.9026941.40  871.3027129.50
GR 874.727372.30  872.0027607.20  873.0027931.80  873.4028166.30  875.6028268.00
GR 871.128477.70  872.1028693.50  872.0028755.00  872.6029051.60  872.4029285.30
GR 872.229519.20  872.0029716.70  867.2029727.60  871.6029749.70  873.5030054.00
GR 873.230458.10  872.8030472.40  872.4030751.40  875.6030931.40  873.3031107.60
GR 875.331274.80  875.0031561.40  875.4031780.90  876.0032095.80  876.3032310.50
GR 878.132663.30  878.6032804.60
HD187.73      10
HE187.73

NC0.0650   0.025   0.030    0.10    0.30
X1187.82      9819134.4020575.20  475.00  375.00  490.95
XL                      19134.4023950.00
GR 880.017839.60  878.8018098.90  875.4018327.40  874.2018552.60  874.9018811.80
GR 871.019033.60  867.9019077.10  868.8019134.40  862.9019145.80  860.7019155.60
GR 864.619175.20  858.5019197.80  857.9019588.80  861.4019735.30  855.4019775.80
GR 859.819919.30  865.9019963.50  867.7020108.80  863.8020137.00  865.2020204.40
GR 857.420241.30  860.6020549.20  868.8020575.20  865.4020758.10  867.1021181.50
GR 867.321213.20  867.8021453.20  868.7421600.00  869.1021656.20  870.6721920.00
GR 871.021975.70  869.6022232.90  870.0022484.80  868.6022730.40  868.7022858.10
GR 866.222968.70  868.4022980.60  868.5023209.70  868.7023330.20  868.3023571.10
GR 867.323636.60  871.9023671.50  873.0023919.30  873.0024172.80  872.6024428.00
GR 875.324475.90  868.3024487.10  869.1024499.50  874.5024509.50  874.1024769.50
GR 873.425027.30  873.5025282.10  873.8025526.20  874.1025764.80  875.4025787.50
GR 872.325804.50  872.8025925.40  876.4026069.30  876.0026357.60  875.9026608.70
GR 876.626869.90  876.2027226.60  876.2027613.30  877.0027866.40  877.3028133.40
GR 877.128329.40  874.4028413.50  875.3028472.80  871.5028484.70  875.2028521.60
GR 876.228809.10  876.1029099.30  876.4029466.70  874.9029693.70  873.5029703.00
GR 876.929716.10  876.1029734.10  869.5029744.80  875.2029764.50  874.8029781.80
GR 876.729797.20  877.1029999.70  876.9030226.90  876.9030459.30  877.2030789.80
GR 877.831033.10  875.2031065.30  876.4031067.50  874.7031083.30  876.3031121.10
GR 877.331358.40  877.3031630.30  877.0031653.30  877.6031884.00  878.0032131.00
GR 878.932435.60  879.9032662.40  879.9032821.10
HD187.82      10
HE187.82

NC0.0650   0.025   0.030    0.10    0.30
X1187.91      9719105.1020861.30  430.00  505.00  456.46
XL                      19105.1024400.00
GR 880.818003.20  877.8018217.80  878.6018433.40  876.2018691.10  875.2018803.40
GR 870.318947.30  868.7019049.70  869.8019105.10  863.3019184.50  858.4019212.20
GR 858.519285.00  859.2019608.00  860.6019815.60  858.2019824.70  856.5019913.60
GR 864.120023.90  865.6020081.60  861.6020095.60  859.6020145.50  857.4020158.60
GR 861.120452.60  866.6020492.70  868.4020615.20  867.1020861.30  868.7021099.50
GR 868.721319.30  869.0121500.00  869.2021608.10  868.2021635.50  873.1021671.20
GR 870.821690.30  870.2021772.70  870.0022007.10  870.0022113.40  869.6022353.10
GR 869.422602.50  868.8022851.60  870.7023024.50  867.5023040.30  868.3023057.70
GR 870.423061.70  869.2023279.50  869.3023505.40  869.3023813.20  868.7024023.90
GR 869.024242.80  868.9024448.90  870.9024457.20  871.6024605.10  877.8024644.20
GR 870.524660.00  871.1024676.70  878.4024696.70  874.1024770.50  874.9025041.40
GR 874.925398.20  874.8025628.00  873.6025855.60  873.2025946.50  877.2026134.70
GR 876.926290.90  876.8026509.70  876.7026695.50  876.6026935.70  876.4027193.90
GR 877.627489.90  877.8027760.50  877.5028014.60  878.0028227.10  877.8028397.10
GR 875.228412.00  877.0028462.30  878.5028463.10  874.1028497.20  877.9028548.80
GR 876.328817.10  877.0029100.50  877.3029394.70  876.8029675.70  877.3029699.80
GR 876.229714.90  878.0029719.90  877.2029740.00  870.8029751.40  877.0029766.00
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GR 877.730036.60  877.7030409.70  877.7030488.10  878.1030717.40  878.5030951.80
GR 878.931075.80  877.4031384.00  878.3031731.10  879.7032092.90  880.0032309.30
GR 880.432596.00  881.5032822.90
HD187.91      10
HE187.91

NC0.0650   0.026   0.030    0.10    0.30
X1188.00      9819064.7320848.70  505.00  545.00  526.41
XL                  19009.2024800.00
GR 882.717809.50  871.3018032.20  870.2018276.60  868.3018423.80  871.2018503.00
GR 867.418526.50  871.2018545.00  873.5018580.90  877.1018792.00  876.1019009.20
GR 874.419064.73  873.5019095.90  871.0019119.60  866.6019135.50  858.5019146.60
GR 863.619191.60  863.4019215.50  858.8019613.80  860.8019662.50  858.6019687.50
GR 864.219855.80  858.3019952.90  859.2020053.80  860.5020309.50  866.1020360.50
GR 863.320417.80  864.6020632.70  868.3020848.70  868.4321040.00  868.5021143.70
GR 868.621354.60  869.0021579.20  867.8021617.40  872.3021647.50  872.3021867.10
GR 871.922088.00  871.9022301.10  873.3022378.50  870.1022407.20  869.9022631.30
GR 869.822874.10  869.1022916.60  869.7023000.50  869.1023239.40  869.4023543.40
GR 869.423676.70  868.7023898.30  868.8024195.40  868.8024409.20  871.4024443.00
GR 869.324470.70  870.5024810.40  871.2025085.20  872.1025305.80  872.3025559.60
GR 874.425738.20  878.9025745.90  878.1025763.10  872.0025772.80  872.2025787.10
GR 879.825796.40  875.5025832.30  875.3026004.60  878.7026202.50  878.0026529.20
GR 878.026570.70  878.0026857.90  877.7027071.10  874.8027120.80  877.1027140.60
GR 877.527366.00  878.2027646.80  878.3027689.40  878.6028007.80  879.0028238.90
GR 879.728350.40  877.1028686.30  877.4028911.90  877.3028974.70  878.1029188.70
GR 878.829434.60  878.9029673.30  876.3029685.90  879.6029706.70  872.7029717.00
GR 878.029732.60  876.6029953.20  877.6030214.90  878.5030455.50  879.1030815.70
GR 879.831029.50  877.7031098.80  878.8031381.40  878.6031701.50  879.0031992.00
GR 879.232205.10  880.8032566.20  881.9032782.30
HD188.00      10
HE188.00

NC0.0650   0.025   0.030    0.10    0.30
X1188.07      6219107.5420858.72  289.03  304.03  289.92
XL                  19098.0025260.00
GR 884.017738.50  887.4319088.50  881.1819098.00  876.5319104.80  875.3819107.54
GR 864.019134.70  855.0019178.00  855.0019198.00  855.0019455.60  856.0119545.90
GR 855.819569.50  855.8219573.50  855.0619633.00  857.8119687.00  857.8119691.00
GR 858.519749.50  860.0619805.50  860.0619809.50  863.1519867.60  863.2519923.20
GR 863.319927.30  858.5319980.70  857.2320041.40  857.2320045.50  856.6820070.50
GR 855.020159.20  855.0020163.20  857.4220224.30  856.7420278.00  856.7420282.00
GR 857.620335.50  855.3520395.50  855.3520399.50  855.0020472.70  855.0020517.50
GR 856.120527.60  858.9120562.10  862.4020631.40  862.4020635.40  865.4320686.60
GR 866.520749.10  866.4720753.10  867.7020842.40  875.3820858.72  878.4820865.30
GR 879.920869.00  886.1520881.80  885.6021833.80  872.6021858.00  872.7022095.60
GR 874.222385.20  871.9022632.40  873.1022983.90  870.0023006.60  868.7024233.40
GR 870.824410.30  868.9024443.10  871.9025188.30  871.9025395.50  873.1025667.10
GR 873.125840.40  879.3025851.70
HD188.07      10
HE188.07

NC0.0650   0.029   0.030    0.10    0.30
X1188.10      9518969.1220853.20  196.03  246.03  193.81
XL                        25480.00
GR 882.418347.40  878.8018572.70  878.7018758.40  876.6018775.80  878.0018941.30
GR 875.618969.12  864.6019094.20  860.9019118.10  861.0019192.90  861.5019412.60
GR 860.919528.90  855.8019600.50  861.4019728.60  856.4019774.50  862.5019832.00
GR 862.719890.50  866.3019949.70  860.0019988.20  864.2020045.10  857.0020057.90
GR 859.820120.80  858.4020135.00  858.6020312.50  862.6020340.00  860.2020360.20
GR 861.420434.80  860.3020503.20  861.2020731.20  860.6020768.80  867.3020853.20
GR 865.020859.80  866.7020890.90  867.5121000.00  868.4021120.00  869.2021317.10
GR 867.221327.30  872.2021462.40  879.5021504.30  880.9021594.50  871.9021619.20
GR 872.421838.10  872.5022088.80  873.3022346.60  871.8022618.30  872.1022871.40
GR 870.923110.70  870.5023328.50  870.9023910.70  870.9024128.50  871.9024346.80
GR 872.824634.30  875.3024851.60  871.3024992.50  872.1025537.80  873.2025759.50
GR 877.125996.20  876.8026048.20  880.9026058.80  880.8026068.90  874.4026074.60
GR 874.926085.10  881.1026105.20  877.4026162.00  877.8026406.00  877.0026697.10
GR 877.526922.70  876.8027143.80  877.8027491.20  879.2027752.40  879.7028017.50
GR 879.028234.90  879.6028483.00  879.3028715.80  879.3028936.00  877.4029185.50
GR 877.029421.80  878.6029550.50  874.3029564.20  879.2029579.50  879.9029599.50
GR 878.229632.40  878.4029794.70  878.4030073.80  879.2030375.20  880.4030599.90
GR 879.130849.70  881.5030888.10  879.1030961.60  879.4031200.20  879.4031417.60
GR 879.531470.10  879.2031848.80  880.6032174.00  881.4032428.30  881.2032616.00
HD188.10      10
HE188.10

NC0.1500   0.026   0.030    0.10    0.30
X1188.20      9519103.9020706.50  620.00  340.00  525.06
XL                  18700.0025750.00
GR 884.118202.10  882.8018292.20  884.9018364.80  880.3018481.20  870.1018517.50
GR 865.218656.40  869.4018668.50  868.8918700.00  864.7018959.80  867.3019103.90
GR 861.019127.90  859.3019303.30  861.6019579.20  861.2019818.30  861.3019932.00
GR 859.419971.90  862.3020039.00  859.6020082.80  864.3020097.00  860.0020135.80
GR 865.720352.00  859.3020387.90  862.1020412.20  859.7020465.30  864.1020706.50
GR 861.220891.90  862.5021134.10  874.7021232.40  874.1821280.00  872.0021481.00
GR 872.721602.00  880.4021652.90  878.8021696.50  872.7021718.10  873.5022013.90
GR 871.822319.80  872.5022552.90  873.9022791.90  871.8022854.80  873.2022934.00
GR 873.123187.60  872.6023502.40  872.6023512.10  872.2023892.50  871.3024135.90
GR 872.024219.20  872.1024453.80  872.5024691.30  871.8024794.90  874.3024812.50
GR 872.125118.60  872.2025362.10  873.6025635.80  877.0025892.10  876.3026124.20
GR 881.226142.40  881.0026155.80  876.2026160.30  875.7026172.10  882.2026190.20
GR 879.926255.10  881.6026277.80  881.6026559.10  880.9026906.30  880.3027019.20
GR 879.027457.70  879.0027731.00  879.7027979.40  880.5028323.10  879.4028566.50
GR 880.128798.10  878.2028887.20  878.6029119.40  880.3029138.40  877.7029373.10
GR 879.629429.20  875.6029438.00  880.6029451.90  877.7029469.00  878.6029678.40
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GR 879.229955.60  878.6030389.60  879.1030704.50  880.7030750.70  878.8030757.70
GR 880.231041.00  880.2031048.40  880.9031312.40  880.9031321.00  880.6031577.20
GR 880.631611.90  881.8031883.30  879.8032123.60  882.1032423.10  882.4032447.00
HD188.20      10
HE188.20

NC0.1500   0.025   0.030    0.10    0.30
X1188.29      9319223.3020605.80  505.00  310.00  492.53
XL                              26000.00
GR 885.418244.00  881.5018266.40  880.3018355.90  877.0518370.74  875.2018379.20
GR 868.218392.20  870.2018404.30  866.2018528.50  866.6018634.80  863.9018804.20
GR 867.919004.20  864.7019223.30  860.7019241.00  860.8019602.10  861.2019893.50
GR 862.520119.10  868.3020155.00  864.6020242.10  864.4020313.20  862.6020418.40
GR 859.620456.60  861.0020473.60  860.1020520.10  865.0020540.30  859.9020577.80
GR 869.420605.80  864.9020647.80  862.5020774.50  866.1020982.30  862.1021068.60
GR 864.621139.60  864.7021491.60  864.4021506.80  874.8021587.30  874.7221600.00
GR 873.521797.30  880.2021871.20  879.5021886.50  872.9021905.20  872.4022321.30
GR 872.822962.30  872.5023731.40  870.8023999.30  872.4024276.90  872.2024661.20
GR 874.424686.00  872.8024953.80  872.2025217.30  872.2025419.50  875.7025497.30
GR 872.125597.50  875.8025817.60  876.7026152.90  876.6026275.30  882.5026285.70
GR 883.026299.00  876.2026304.30  876.1026319.00  881.5026330.30  877.9026367.60
GR 880.026411.80  880.5026713.50  879.4027091.00  879.9027521.90  879.5027830.40
GR 880.627985.00  879.1027986.70  879.4028026.00  880.8028044.10  880.0028489.90
GR 879.428771.70  877.5028996.70  881.1029002.50  876.6029241.20  879.9029301.10
GR 875.729307.90  879.5029323.00  877.3029339.70  878.2029613.40  877.8029894.10
GR 878.030242.10  877.8030503.10  879.0030590.30  882.1030602.20  879.2030611.50
GR 881.330619.30  878.1030632.00  880.7030666.80  880.0030984.00  880.6031756.80
GR 878.732055.10  881.7032070.60  882.8032101.00
HD188.29      10
HE188.29

NC0.1500   0.025   0.030    0.10    0.30
X1188.39      9319276.5021090.60  705.00  280.00  536.34
XL                              26130.00
GR 888.318183.00  880.4018214.80  877.3918219.99  870.3018232.20  868.2018242.80
GR 863.518338.10  867.6018555.10  864.4018713.40  870.7018871.00  865.5019003.90
GR 865.619161.20  863.9019179.70  868.3019276.50  861.6019362.20  860.8019635.30
GR 860.819867.50  861.3020129.90  860.7020165.10  862.2020403.00  861.0020644.00
GR 864.520689.40  863.0020713.60  869.8020749.30  863.4020863.40  865.9021090.60
GR 861.921171.50  865.7021210.20  862.1021270.30  865.6021439.40  864.5021603.90
GR 875.321698.40  874.8521760.00  874.1021863.00  880.3021938.70  879.6021956.80
GR 872.421976.80  872.4022220.20  872.0022456.50  872.6022982.80  872.6023189.40
GR 871.723439.60  871.7023692.10  871.3023922.70  872.7024173.20  872.7024445.70
GR 873.024718.20  873.0024953.50  871.3025204.40  871.5025515.50  875.7025626.40
GR 877.325908.50  877.3026133.60  877.0026234.90  875.4026261.40  877.2026273.10
GR 881.926285.10  883.1026296.60  876.1026301.60  876.5026314.10  881.4026323.00
GR 880.726341.10  877.7026359.50  879.8026656.90  879.2027191.30  879.2027448.80
GR 879.327677.20  878.7027908.20  879.0027933.80  881.1027943.60  878.5027982.40
GR 879.228440.30  879.2028733.90  879.5028963.00  882.0029150.40  880.1029216.60
GR 874.829224.50  880.5029236.50  877.8029289.10  878.4029545.50  878.4029919.20
GR 879.130412.90  879.0030507.80  880.8030517.70  879.4030527.70  881.1030533.70
GR 880.130821.40  880.8031050.20  880.3031316.30  879.3031630.10  879.9031926.00
GR 883.131999.80  884.1032272.50  884.4032297.00
HD188.39      10
HE188.39

NC0.0650   0.025   0.030    0.10    0.30
X1188.50      9519334.8021108.40  790.00  245.00  581.55
XL                              26100.00
GR 891.217952.50  880.5017975.20  877.7317985.99  873.2018003.60  868.6018093.70
GR 865.718306.90  868.5018331.50  869.2018612.00  870.8018636.50  868.0018795.50
GR 863.518840.80  869.1019008.30  866.0019087.00  868.7019164.40  866.1019179.80
GR 870.119218.20  869.7019334.80  863.3019381.50  864.6019627.00  860.5019659.70
GR 863.619778.00  860.6019904.20  863.2019952.70  862.1020123.70  864.0020390.10
GR 868.720433.70  865.9020537.90  861.3020581.60  863.8020722.30  862.8020825.00
GR 865.220889.70  866.0020988.20  863.5021057.60  866.8021108.40  863.9021229.70
GR 865.221315.40  863.7021593.30  866.8021667.00  866.2021699.00  876.2021762.00
GR 873.121809.00  873.6521830.00  874.7021870.40  880.1021907.80  879.3021947.60
GR 871.921970.20  870.7022362.10  875.4022438.20  872.6022471.80  871.9022855.60
GR 872.023197.40  871.8023596.60  871.5023755.30  873.0024238.80  872.5024588.40
GR 872.425251.90  875.4025522.10  877.6025914.40  877.8026100.40  876.1026154.00
GR 880.926166.80  880.7026179.00  875.9026182.90  875.7026195.20  881.7026205.50
GR 878.226244.70  880.2026305.90  880.6026591.60  880.6026623.10  880.0026919.50
GR 880.027323.40  878.5027656.20  878.0027712.90  880.2027726.50  878.6027726.80
GR 880.727770.60  879.1027838.60  878.9028213.50  879.5028599.10  878.4028905.80
GR 881.528980.50  879.0029295.30  879.2029593.30  878.0029929.60  877.7030215.60
GR 881.130375.70  875.0030388.70  880.4030399.90  878.3030426.90  878.5030742.20
GR 879.231040.40  878.8031430.40  882.4031704.90  880.9031865.00  882.9032021.00
HD188.50      10
HE188.50

NC0.0650   0.025   0.030    0.10    0.30
X1188.59      9619320.9020855.00  510.00  390.00  493.58
XL                              25972.00
GR 881.217700.90  892.1017736.40  890.6017747.20  880.6017756.50  878.1017764.80
GR 870.517790.00  869.0017959.10  865.6018043.80  872.8018168.30  870.3018344.10
GR 867.518405.60  872.6018632.10  867.3018820.70  869.1018898.20  867.1018922.90
GR 870.218939.50  867.0018960.70  866.1019130.40  870.4019178.70  866.6019220.20
GR 871.519320.90  869.1019349.40  862.7019372.60  866.3019636.00  861.5019689.90
GR 865.319720.80  863.0019950.60  865.7020047.60  861.4020070.10  864.6020494.40
GR 866.320602.20  863.8020635.10  868.5020698.00  866.4020743.80  868.5020780.60
GR 867.420855.00  864.7020888.60  866.7021163.40  865.1021216.50  867.1021345.70
GR 865.821660.30  866.7021803.80  874.1021870.60  871.8021899.80  875.6021931.50
GR 878.121939.66  880.5021947.50  879.8022001.60  873.0022019.30  872.1022150.20
GR 875.622281.90  874.7022621.70  871.9023015.10  871.4023333.40  871.9023532.60
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GR 873.424299.50  873.4024677.90  872.5025011.80  871.6025144.30  877.2025287.10
GR 877.725601.40  878.4025972.00  877.4026006.70  880.4026024.10  875.6026027.60
GR 876.026042.70  881.3026053.80  881.1026072.80  877.6026089.10  879.7026129.70
GR 880.526459.10  880.1026766.80  880.1027084.60  878.7027410.60  879.2027828.60
GR 880.128150.30  880.7028166.50  878.8028176.70  879.1028538.90  877.7028728.70
GR 880.328803.70  879.1029126.80  877.7029453.50  879.2030156.10  874.1030165.80
GR 878.430178.40  876.3030387.80  879.9030760.50  880.0030800.00  875.8030865.50
GR 875.730896.30  879.3030955.50  879.8031358.10  878.5031414.30  881.6031466.30
GR 882.531910.00
HD188.59      10
HE188.59

NC0.1500   0.025   0.030    0.10    0.30
X1188.70      9419273.4021606.60  635.00  410.00  542.71
XL                              25950.00
GR 893.117683.70  888.3017693.20  880.6017700.90  878.5017705.12  870.5017721.20
GR 867.217735.20  869.7017748.40  867.1017957.60  869.2018031.30  868.2018100.90
GR 872.618185.60  871.2018385.60  867.5018512.90  872.3018709.40  868.9018782.60
GR 871.318885.30  869.2019088.70  867.9019273.40  864.2019306.90  864.8019571.20
GR 866.119773.60  869.1019907.10  863.8020104.10  866.1020163.30  865.0020447.10
GR 867.520594.00  863.3020617.20  865.7020628.20  869.8020682.90  870.5020832.20
GR 868.320958.30  864.4021006.40  865.2021234.80  867.4021401.80  868.0021606.60
GR 868.421818.80  866.7021886.10  873.9021960.70  871.3021978.20  873.5022006.90
GR 878.522041.48  880.6022056.00  879.2022138.20  874.1022161.20  873.1022456.10
GR 873.122682.40  872.7023206.50  873.0023301.50  875.2023331.20  873.9023574.20
GR 873.723798.10  873.2024013.40  872.8024437.50  872.9024662.00  872.0024899.40
GR 876.425108.70  876.8025180.00  875.5025409.70  876.1025722.90  878.2025925.00
GR 880.925952.70  875.8025958.20  876.3025969.60  882.3025981.40  879.0026077.10
GR 878.526372.10  879.2026614.30  878.0026834.70  878.5027100.60  880.1027314.70
GR 878.427406.50  877.8027898.90  878.8028126.60  878.6028336.40  878.3028541.60
GR 876.628686.20  878.1028702.30  878.3028929.80  877.8029145.60  876.8029473.80
GR 876.529678.20  877.2029883.80  877.1029939.70  871.6029954.50  877.3029970.20
GR 876.330303.70  877.1030573.40  877.2030847.90  877.5031112.60  878.2031427.70
GR 880.631922.50  881.4032125.60  881.8032373.30  882.6032454.00
HD188.70      10
HE188.70

NC0.1500   0.025   0.030    0.10    0.30
X1188.81      9519379.1021730.60  790.00  215.00  612.89
XL                              25840.00
GR 891.517608.20  878.6017639.80  881.2017654.80  875.2017697.30  872.7017702.30
GR 870.117733.00  867.5017813.10  872.3017934.90  870.5018194.50  866.8018426.10
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GR 873.622162.10  878.9722204.58  881.3022223.00  878.6022343.70  872.8022432.40
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GR 872.724806.10  875.2024922.50  877.4025296.70  876.8025558.20  877.4025807.30
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GR 877.826563.80  878.2026904.70  877.6027116.10  880.5027180.10  878.1027260.90
GR 878.527513.20  877.4027754.20  880.5027831.30  878.4027871.80  879.2028253.70
GR 881.928283.20  877.7028297.90  879.3028822.10  878.5029204.40  878.3029481.10
GR 877.129748.80  877.9029791.30  872.6029807.10  877.7029827.30  877.2030107.20
GR 877.330405.50  878.6030713.80  878.3030970.40  878.4031125.40  877.9031389.60
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HE188.81

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GR 871.218962.80  873.6019026.00  869.9019069.90  874.9019096.60  873.0019185.10
GR 871.419193.60  873.7019317.80  872.0019399.60  865.8019428.70  865.8019678.70
GR 865.819854.20  864.1020312.80  863.3020572.30  868.1020591.00  870.0020610.10
GR 868.220722.00  871.2020790.40  869.4020858.10  871.8020879.80  865.9021103.70
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GR 879.823372.50  879.8023655.40  879.6023930.80  879.2024170.30  879.0024431.80
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GR 879.726721.30  880.2026949.70  877.9027016.10  878.7027245.50  879.8027492.00
GR 879.127754.90  879.6028039.40  879.3028262.00  880.5028283.10  878.7028506.90
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GR 879.229593.70  874.4029605.30  877.9029618.50  876.5029660.60  877.6029685.60
GR 876.529908.50  876.7029973.80  877.4030244.00  877.4030324.60  877.1030569.10
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HE188.92

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GR 885.817446.37  885.9217451.58  884.0217465.65  884.4517468.48  881.6117487.39
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GR 881.517518.45  881.6317521.52  881.5217523.70  881.7117539.96  881.9717551.36
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GR	880.717666.02	880.6617668.02	880.0317683.81	880.1117687.25	879.8717694.34
GR	880.017711.18	879.7117717.02	877.6717730.22	876.8917733.65	875.7117743.39
GR	875.717750.56	875.5717776.91	875.4417791.46	875.2117828.40	875.1617836.39
GR	875.117842.85	874.9517893.49	874.9117918.66	874.6817939.00	874.6117950.41
GR	874.717964.99	874.2217979.75	874.0817985.86	873.9017996.35	874.0018002.21
GR	873.818016.47	873.8118021.51	873.4518026.16	872.9818029.76	872.6618038.51
GR	872.018046.99	870.6518063.12	870.3418088.58	870.7818114.79	871.2118125.23
GR	871.318127.31	870.9718132.13	870.8418136.37	870.1218151.86	869.8218158.81
GR	869.618178.69	869.6318182.66	869.4218193.37	869.1018233.33	869.0218240.66
GR	869.118250.54	868.7518285.01	868.9018288.29	870.4518303.75	870.5218310.30
GR	870.818330.34	868.6418339.22	869.2718357.72	869.8618374.32	870.0518377.05
GR	870.718382.86	871.4218389.52	870.4118394.05	869.0718399.52	868.9218400.86
GR	872.018412.83	871.8018416.10	871.4118421.35	869.3518431.08	868.7618434.66
GR	868.718435.34	871.0318450.25	871.3518452.14	871.1918462.55	871.1518478.64
GR	871.718491.78	872.0218500.11	872.2918509.54	872.3218515.25	871.8118529.15
GR	870.718549.07	870.4018561.66	870.4518570.73	870.5618575.29	870.5618579.41
GR	869.718586.16	869.5718601.55	868.8118611.37	867.7418621.39	869.4818631.44
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GR	871.718707.33	871.4218710.75	871.4518715.55	871.8118734.63	872.3718759.79
GR	872.618773.80	872.5818789.42	872.4518826.92	872.7918848.24	872.9118858.37
GR	872.818870.24	872.6218895.76	872.4918913.55	872.5118916.09	872.5218936.43
GR	871.918979.92	871.8018986.32	871.8918993.20	872.1619018.45	872.1619042.17
GR	872.019110.38	871.0519158.20	870.8219186.09	871.4919234.98	871.1219266.29
GR	870.519306.20	870.4219323.31	870.1119339.11	870.3719347.13	871.9519387.52
GR	872.119396.88	872.3819407.94	873.8119462.81	873.4219498.44	873.2219512.27
GR	873.319514.60	873.2019517.40	871.8519523.70	871.5819524.97	867.2019547.83
GR	866.219557.69	863.8719584.70	863.4519589.30	863.5819614.72	864.1719656.05
GR	864.819690.63	863.9819732.57	863.2319766.64	863.5819781.87	864.2119808.05
GR	864.819827.46	864.6119852.07	862.0819880.99	859.7219911.39	859.4419915.54
GR	858.219942.57	858.2219946.37	857.5020007.46	857.4420015.42	858.4320044.01
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GR	859.020322.14	859.0020331.80	858.3620358.50	857.6220389.89	857.1420411.37
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GR	867.420672.25	868.8720686.02	869.1720688.44	868.9220692.37	868.7620698.01
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GR	868.520773.66	869.6920795.40	869.5520806.88	869.1220846.20	869.2320856.92
GR	868.820859.59	864.0320879.31	866.1520889.87	868.8220900.47	869.8020905.05
GR	870.020906.77	869.1220910.71	866.8420919.94	866.7020929.20	866.7720931.92
GR	864.220944.22	863.0420950.55	862.8820968.65	862.7420978.38	862.6220982.55
GR	862.820983.63	864.9220999.71	867.7521021.60	868.3821024.91	868.4421031.52
GR	868.421040.71	868.0321048.28	867.2221066.53	864.2621106.64	863.9021110.55
GR	860.721158.26	857.7621170.46	859.7521189.01	859.9521190.49	859.7621210.34
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GR	862.921364.50	862.3721397.89	861.5921435.87	861.1721445.37	860.6721462.17
GR	860.521469.87	860.4121477.83	861.1421491.91	860.6021497.02	859.4921539.26
GR	859.821552.98	860.2021555.07	861.1621563.25	861.6321565.77	862.6621574.17
GR	863.421581.95	864.0221586.56	865.8521601.54	866.1221604.05	866.4921610.05
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GR	875.223577.29	875.2823606.62	875.2923640.16	875.3923663.77	875.2623684.42
GR	875.223720.90	874.9323762.61	874.9223766.00	874.8823778.04	874.9923791.53
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GR	874.624580.08	874.5724594.07	876.0024685.68	876.0025171.47	876.6925240.01
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GR	880.030685.56	880.0030692.14	879.6430720.77	878.5330808.14	877.3330916.99
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HE189.02

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GR 868.718494.64  868.8018498.73  869.2618512.01  870.5118524.03  870.9818529.16
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GR 866.021064.96  865.8921065.91  864.7421075.86  863.3021088.28  863.1921089.47
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GR 862.121163.14  862.0221163.83  858.8521218.06  858.4821237.02  858.3721241.96
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GR 886.518111.75  885.7718116.29  884.7618120.27  884.6318121.31  881.9218131.71
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GR 875.118881.74  875.0818882.92  875.6718948.89  875.6718950.11  874.1619035.12
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HE189.68

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GR 876.721173.22  876.9121186.01  877.0421194.62  876.9021197.95  876.5621207.34
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HE190.05

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GR 872.022208.08  871.9922221.83  872.1922229.91  872.5022234.62  873.1022241.85
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HE190.43

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HE193.93

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HE194.09

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HE194.29

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HE194.40

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X1194.53      9519166.9020511.50  475.00  630.00  661.08
XL                     17250.0022150.00
GR 924.715853.10  919.6015994.70  919.1016135.50  920.0016297.80  910.1016346.40
GR 907.016386.50  909.1016574.90  906.0016736.80  907.2016922.10  910.0017074.00
GR 907.117201.60  904.2017362.90  906.1017506.40  905.8017650.50  905.9017793.40
GR 908.517932.00  906.8018017.00  907.4018162.30  906.3018309.20  911.3018448.00
GR 910.218608.90  911.6018710.20  910.1018739.20  911.2018856.70  909.2018928.90
GR 901.718975.00  897.1019047.70  901.7019093.80  905.0019166.90  896.2019213.00
GR 896.219757.00  899.7019808.70  896.4019828.80  896.9019998.40  897.9020025.10
GR 900.620185.10  902.2020284.60  899.7020441.50  898.7020511.50  900.7020712.90
GR 897.820739.70  897.8020897.10  895.2021003.00  901.0021040.30  902.8021145.00
GR 901.521151.20  903.6021240.00  900.8021443.80  903.2021540.40  905.3021693.50
GR 896.621845.20  898.7021879.60  908.4021925.80  910.4021997.90  909.7022080.70
GR 912.122150.00  909.3022200.50  902.5022242.70  914.1022292.90  909.7022309.50
GR 909.322328.30  912.1022387.70  900.2022405.70  901.6022436.70  904.3022444.00
GR 905.422454.60  912.2022466.60  912.6022484.40  909.1022503.40  909.7022533.30
GR 908.122539.30  910.2022567.50  909.5022697.60  909.9022863.90  909.9023032.00
GR 911.823143.50  910.5023151.10  911.4023424.60  912.3023581.90  912.7023739.00
GR 913.123926.60  913.4024071.00  913.8024241.40  913.4024402.10  915.5024428.90
GR 914.524661.10  915.0024808.20  914.8024930.70  915.3025153.50  915.4025316.70
GR 915.625548.30  915.7025705.00  918.6025732.60  917.3025773.60  919.0025797.00
HD194.53      10
HE194.53

NC0.0250   0.043   0.030    0.10    0.30
X1194.62      9619047.8020579.40  475.00  535.00  501.02
XL                     17350.0021793.50
GR 925.816124.90  919.2016259.30  914.7016390.70  912.8016536.40  912.2016588.20
GR 909.416745.20  906.3016897.50  907.2017030.60  905.1017191.20  903.5017276.20
GR 907.117408.70  907.1017557.50  906.9017695.30  906.1017835.60  907.1017975.10
GR 907.018114.80  906.0018251.00  904.7018306.10  901.3018402.70  904.6018538.90
GR 907.818574.60  912.1018587.90  913.0018705.80  911.2018766.90  912.6018871.40
GR 900.918913.00  903.3019047.80  896.3019161.20  896.9019427.30  896.7019498.30
GR 896.919737.60  899.9019823.40  896.4019975.40  899.1020129.00  900.6020250.70
GR 900.420438.80  900.7020579.40  897.9020639.60  900.9020681.30  896.0020784.60
GR 896.520909.10  904.1020943.40  902.9021041.20  904.7021081.10  901.2021117.40
GR 902.921164.10  903.0021274.80  898.8021335.60  902.5021389.60  904.1021570.90
GR 903.121576.00  903.1021750.00  910.6021793.50  908.5021956.80  910.7022117.60
GR 902.922166.90  911.6022199.60  909.5022284.70  911.1022308.20  910.1022332.60
GR 898.922352.20  901.2022377.30  912.8022411.50  911.8022450.90  908.5022460.90
GR 911.222478.10  911.7022494.10  911.5022630.30  911.4022698.00  911.4022856.50
GR 911.522875.20  911.5023015.30  912.1023149.40  912.8023222.10  914.1023423.10
GR 914.223447.50  914.2023640.10  914.1023714.80  914.9023913.80  915.2023953.50
GR 916.324165.90  916.2024288.10  915.6024427.20  917.0024566.60  917.8024721.90
GR 918.124856.00  918.2024870.60  917.6025138.60  917.7025147.10  918.1025351.10
GR 918.125355.30  918.1025577.80  918.1025584.80  918.2025717.20  918.9025839.40
GR 921.325856.00
HD194.62      10
HE194.62

NC0.0320   0.043   0.030    0.10    0.30
X1194.72      9718920.1020479.50  495.00  550.00  503.50
XL                     17450.0021735.00
GR 929.816804.80  918.3016838.50  913.0016876.80  909.7016930.80  907.7017061.20
GR 909.517250.90  906.4017371.20  903.8017394.80  911.4017596.60  908.6017789.90
GR 908.017956.00  907.3018099.90  907.4018253.40  907.2018308.30  903.0018473.00
GR 900.918600.90  912.2018634.30  914.8018679.00  910.8018778.70  913.7018793.50
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GR 913.118832.60  903.9018864.70  904.4018920.10  899.5018986.40  901.3019021.30
GR 896.319119.90  895.7019208.60  897.3019402.80  899.3019447.40  899.4019568.00
GR 896.619599.40  896.5019747.90  896.2019871.00  898.2020023.10  898.9020186.00
GR 900.020341.60  900.1020479.50  897.4020529.00  897.7020615.50  902.3020646.70
GR 903.020696.10  898.2020757.10  898.0020858.80  903.8020895.60  904.0021042.00
GR 903.121171.30  905.6021247.70  903.0021433.20  901.3021534.30  904.9021619.20
GR 911.521653.16  911.8021654.50  916.5021698.80  917.1021735.00  904.4021790.60
GR 914.121853.10  914.9021884.00  910.2021932.10  913.3022042.50  904.3022078.70
GR 913.522111.30  909.8022211.90  914.6022254.60  911.5022266.10  911.5022283.60
GR 899.822300.40  900.9022328.30  908.1022341.90  908.3022351.00  916.2022366.20
GR 910.622396.20  911.5022554.10  912.6022725.40  912.6022887.50  912.6023023.80
GR 912.923156.10  914.7023202.40  914.9023415.40  915.1023592.70  915.1023714.10
GR 915.523862.80  915.7023992.60  916.0024100.40  916.5024239.80  916.9024423.40
GR 917.924552.90  919.4024668.10  919.7024823.90  920.0024877.30  919.9025144.00
GR 920.025266.50  920.2025433.10  920.2025577.60  920.2025623.10  920.5025759.10
GR 919.725881.20  921.3025900.90
HD194.72      10
HE194.72

NC0.0320   0.032   0.030    0.10    0.30
X1194.81      9618856.2020537.20  435.00  555.00  485.00
XL                      17580.0021940.00
GR 929.716922.90  918.2016937.50  912.0016990.30  913.4017012.90  906.9017080.50
GR 908.317261.70  909.4017383.00  909.8017498.70  909.8017608.20  909.8017634.30
GR 904.817689.20  910.0017838.90  908.5017890.60  906.8017999.80  907.2018126.80
GR 907.918246.80  907.3018363.10  907.4018479.60  906.7018593.90  909.7018600.50
GR 906.318609.20  909.6018727.50  908.0018779.30  911.1018798.60  911.2018830.90
GR 904.518856.20  902.5018935.60  896.7018976.00  897.0019191.80  897.2019341.90
GR 898.319417.20  898.6019578.50  901.6019646.40  900.7019733.10  896.5019769.60
GR 896.519814.20  896.3020003.60  896.0020146.50  896.3020272.70  898.3020390.40
GR 898.920501.00  899.7020537.20  898.0020682.90  904.4020717.20  903.8020883.90
GR 903.420930.10  903.3021039.60  902.6021164.90  905.2021285.70  903.3021359.40
GR 904.221493.70  910.0021544.50  910.3021625.20  910.3021757.70  910.1021928.60
GR 909.722067.40  909.9022136.10  915.0022161.10  914.5022186.90  915.8022199.90
GR 899.922229.40  901.0022252.80  907.8022267.50  909.2022278.80  916.7022290.50
GR 915.122316.70  911.4022326.90  911.8022424.30  912.8022604.10  912.9022632.40
GR 913.022831.80  913.1022844.80  913.8023053.30  913.9023081.90  914.0023209.10
GR 913.823243.80  915.3023267.20  915.2023463.80  915.9023574.30  916.9023747.50
GR 916.923947.00  916.8024045.80  916.8024228.80  917.6024401.80  917.6024427.80
GR 917.224539.00  919.4024560.20  918.5024615.00  919.5024725.80  920.6024867.40
GR 920.624898.90  920.6025159.10  921.0025256.20  921.9025592.00  921.9025719.80
GR 923.325804.00
HD194.81      10
HE194.81

NC0.0320   0.032   0.030    0.10    0.30
X1194.91      9619028.3020510.70  475.00  530.00  494.18
XL                      17700.0021895.00
GR 929.616952.10  913.9017012.20  910.2017128.10  910.8017136.90  909.6017148.00
GR 908.217236.80  910.2017320.00  909.8017468.50  910.5017586.20  909.9017698.10
GR 909.917751.70  911.7017763.20  909.5017770.90  909.0017876.10  907.3018060.50
GR 907.918162.60  907.6018299.80  907.5018416.30  908.0018533.00  908.4018651.10
GR 909.118748.10  911.1018760.90  911.1018830.00  904.3018869.70  902.8018950.70
GR 905.519028.30  898.1019063.10  897.4019267.50  898.7019368.20  898.7019385.50
GR 900.419570.80  902.0019681.70  900.6019778.30  898.2019817.80  902.0019917.10
GR 901.219959.80  897.3020005.90  897.2020160.60  896.9020390.80  897.7020478.00
GR 905.920510.70  905.2020639.40  904.6020774.00  904.8020900.60  904.2021008.30
GR 904.521188.90  904.5021238.70  911.3021286.90  911.1021406.10  911.0021613.50
GR 911.021644.40  911.0021760.50  910.4021895.20  910.0021989.60  915.2022020.20
GR 916.922059.10  900.4022085.80  901.3022109.80  909.7022127.00  911.4022135.50
GR 918.422147.00  917.5022166.80  911.8022187.20  912.4022309.00  912.8022335.80
GR 912.822457.30  912.8022546.40  913.1022668.70  913.9022860.10  914.7023015.20
GR 914.823141.60  914.0023261.60  914.6023310.00  915.9023316.30  915.9023376.70
GR 916.523509.20  916.6023552.50  916.7023749.50  916.7023804.60  917.3024052.90
GR 917.424071.20  917.4024214.40  918.0024352.20  917.2024486.90  917.7024618.00
GR 919.324754.50  919.6024842.90  919.7024973.50  920.6025114.00  921.1025225.00
GR 921.225408.70  921.6025578.20  921.6025730.20  921.6025843.50  921.2025950.20
GR 922.025967.90
HD194.91      10
HE194.91

NC0.0320   0.032   0.030    0.10    0.30
X1195.00      9619024.5020597.60  435.00  605.00  489.93
XL                      17820.0021431.00
GR 929.516932.10  925.3016948.00  923.6017003.40  918.0017063.40  912.9017187.40
GR 909.117302.40  909.9017423.00  911.8017568.90  912.7017721.00  911.0017849.40
GR 912.417879.30  912.0017990.90  909.5018071.50  911.3018082.80  905.7018094.40
GR 906.918113.50  907.2018286.20  907.2018403.00  906.7018579.50  910.4018695.30
GR 905.918753.80  913.2018792.10  912.6018846.60  906.0018886.00  904.4019024.50
GR 902.419076.50  898.0019114.30  898.3019311.00  898.9019471.70  899.2019668.00
GR 901.719708.20  904.3019807.50  902.3019960.20  898.6020017.50  898.6020063.60
GR 898.320200.20  898.5020259.70  900.6020267.00  899.7020275.00  902.1020284.70
GR 902.120328.60  897.2020401.60  897.0020557.20  906.3020597.60  906.2020747.10
GR 901.620882.30  905.3020906.10  905.0020937.10  911.9020978.00  911.2021101.10
GR 911.221136.10  911.2021274.30  911.3021335.90  911.3021497.50  911.3021617.20
GR 911.421733.60  911.3021836.40  916.0021866.90  917.1021907.10  899.8021930.50
GR 901.621964.00  912.7021980.10  913.4021991.90  917.3022008.80  918.2022022.10
GR 914.022038.70  913.4022185.00  913.9022320.40  913.9022424.10  914.5022581.20
GR 915.022761.40  915.1022914.00  915.2022996.80  915.2023123.90  915.9023314.20
GR 917.923461.70  917.9023659.80  918.0023768.60  918.5023985.50  918.6024027.00
GR 918.924251.10  919.3024353.10  919.4024488.90  919.0024677.00  919.1024773.20
GR 919.224899.60  919.4025006.80  919.7025169.10  919.8025203.80  920.4025447.90
GR 920.425580.50  920.3025712.40  920.2025734.40  920.1025859.80  920.2025977.00
GR 921.826042.50
HD195.00      10
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HE195.00

NC0.0320    0.043    0.030     0.10     0.30
X1195.09       9719034.2820850.30  445.00  575.00  504.00
XL                      17920.0020850.30
GR 929.517259.50  918.1017291.00  911.6017350.10  912.8017371.50  910.2017442.60
GR 912.317562.30  911.6017680.90  914.3017801.10  911.4017901.70  912.4018030.70
GR 912.818158.80  911.4018399.90  909.1018505.80  910.2018643.80  910.4018674.40
GR 905.118732.80  920.1018788.00  918.2018833.40  907.5018856.20  907.2018965.60
GR 918.019017.60  913.4819034.28  903.0019073.00  899.9019111.50  902.5019272.80
GR 902.919386.60  898.8019440.30  901.2019573.10  900.2019740.80  902.0019866.90
GR 900.320023.10  900.3020035.10  899.9020210.70  902.3020272.10  899.1020368.80
GR 901.520399.10  899.1020444.90  900.1020601.70  901.0020687.60  906.4020745.80
GR 905.820818.60  914.6020850.30  913.4020863.80  908.8020881.00  910.0021042.70
GR 906.621169.20  907.3021213.30  911.4021284.90  914.9021419.70  914.8021546.90
GR 915.921671.60  918.2021722.40  918.1021756.20  900.7021799.40  901.8021822.00
GR 907.921833.10  908.0021841.60  916.1021862.10  915.6021886.50  917.2021913.30
GR 914.321918.90  912.7021983.90  913.9022132.40  914.5022301.90  914.6022351.10
GR 915.222514.40  915.5022621.60  915.1022777.60  916.8022912.40  919.8023059.10
GR 920.623191.30  918.5023344.70  917.6023474.60  918.0023488.70  915.4023505.30
GR 919.323594.60  919.6023724.30  919.0023824.00  919.2024027.10  919.7024134.70
GR 919.724307.70  919.8024493.00  919.8024638.00  919.5024766.10  920.7024793.30
GR 918.724859.80  920.0025047.00  919.8025222.70  920.1025272.90  920.8025454.40
GR 920.725586.00  920.3025706.50  921.1025866.30  921.0026005.30  921.5026126.30
GR 921.626177.40  923.4026189.70
HD195.09       10
HE195.09

NC0.0320    0.043    0.030     0.10     0.30
X1195.16       6819040.1720811.55  325.20  340.20  308.36
XL                      17990.0020817.40
GR 912.717788.00  912.2017983.00  911.7018110.00  908.0018204.10  908.0018304.10
GR 916.018389.10  921.1018489.10  922.4018764.10  922.3519009.10  922.2919028.10
GR 915.419038.60  914.3619040.17  900.3219061.60  900.0019126.80  900.0019130.80
GR 900.019190.00  900.0019247.10  900.0019251.10  900.0019309.90  900.0019368.20
GR 900.019372.20  900.0019411.60  900.0019425.70  900.0019475.00  900.0019488.80
GR 900.019492.80  900.1019554.20  901.7019608.90  901.7019612.90  901.6019672.50
GR 902.219730.90  902.1919734.90  902.1019792.80  901.1019850.70  901.1019854.70
GR 900.019918.10  900.0019971.90  900.0019975.90  900.6020059.10  901.3020091.50
GR 901.320095.50  900.5020156.40  900.0020212.50  900.0020216.50  900.0020244.60
GR 900.020276.30  900.0020334.10  900.0020338.10  901.2020395.80  900.5020454.60
GR 900.520458.60  900.0020496.80  900.0020575.10  900.0020579.10  900.0020636.40
GR 900.020696.60  900.0020700.60  900.0020765.90  914.3620811.55  916.2020817.40
GR 923.120838.10  923.3020857.90  923.5020907.90  923.0021862.90  923.4022777.90
GR 923.423187.90  923.6024257.90  920.8025318.00
HD195.16       10
HE195.16

NC0.0310    0.043    0.030     0.10     0.30
X1195.19       9819095.7020820.10  201.00  251.00  185.16
XL                      18030.0020880.20
GR 929.417251.50  923.9017266.00  918.0017276.70  912.3017302.20  911.2017415.20
GR 912.717599.40  910.5017738.60  912.7017858.20  912.2018053.10  911.7018180.70
GR 912.518350.00  911.7018472.40  909.2018587.80  909.3018694.30  905.9018751.30
GR 918.618795.70  918.6018826.10  906.8018879.60  905.1018942.70  906.0018988.30
GR 917.819027.80  914.4619044.34  904.1019095.70  900.8019147.60  902.6019267.80
GR 903.919341.30  900.7019379.00  901.5019496.90  903.9019621.00  902.0019657.90
GR 901.519784.00  901.0019941.80  902.9019962.50  901.8020120.80  902.2020363.90
GR 902.420479.80  906.4020524.00  902.7020552.00  901.3020737.80  904.0020820.10
GR 914.520874.30  915.6020880.20  916.6020986.20  903.5021026.50  904.1021115.20
GR 908.921202.90  907.3021328.70  910.0021404.00  912.4021415.40  907.6021475.10
GR 910.821581.50  915.0021605.20  917.0021634.20  907.0021647.70  908.1021659.60
GR 903.821670.50  903.7021704.60  909.1021719.80  910.6021732.50  916.1021744.60
GR 913.121797.50  915.2021849.20  914.8021967.10  914.9022139.30  915.2022239.90
GR 915.522357.50  915.7022543.90  916.0022689.50  918.0022765.40  916.6022811.00
GR 917.622940.30  917.6022991.20  917.4023144.90  917.4023184.20  917.5023331.20
GR 917.823393.10  917.9023529.10  919.0023588.00  917.9023641.70  918.3023770.90
GR 919.523913.40  919.5023976.40  919.5024128.70  919.6024202.00  920.6024352.50
GR 920.024796.70  920.3024912.30  921.0025035.30  921.6025431.50  921.8025537.40
GR 923.025746.70  923.6025897.40  923.5026020.50  923.6026085.20  922.9026235.50
GR 925.726334.20  928.4026353.00  928.1026447.00
HD195.19       10
HE195.19

NC0.0320    0.043    0.030     0.10     0.30
X1195.28       9719165.2021105.90  655.00  500.00  472.67
XL                      18260.0021591.50
GR 929.917044.90  914.8017154.00  912.3017304.30  913.7017482.40  914.5017619.60
GR 913.417774.60  913.6017910.70  913.5018080.00  913.0018219.20  912.0018370.30
GR 914.518499.90  914.3018607.40  909.9018712.50  911.6018773.80  908.5018810.60
GR 918.118852.30  918.7018876.80  916.6018884.80  912.6018931.30  918.3018969.80
GR 916.018983.70  914.6018992.60  910.0019009.00  907.2019043.60  908.2019085.20
GR 906.919153.10  908.0019165.20  902.0019190.50  902.2019345.50  903.4019390.10
GR 901.519451.60  901.4019610.20  902.4019774.20  902.3019842.20  902.2020301.60
GR 902.120378.30  904.2020415.30  901.9020440.50  901.7020604.80  903.8020617.20
GR 905.720701.20  901.6020793.40  901.4020917.60  901.3020958.30  904.2020979.70
GR 902.721035.40  910.5021105.90  908.5021177.90  908.9021323.60  908.5021460.50
GR 907.721500.00  917.2021568.80  918.1021591.50  914.0021594.10  906.2021603.70
GR 907.121616.50  903.7021622.10  907.1021676.90  914.6021687.00  918.4021689.70
GR 916.221716.10  912.5021733.80  914.2021875.30  914.4022006.60  914.2022074.60
GR 915.122457.00  915.3022626.60  915.4022768.70  917.5022908.20  918.0022939.00
GR 918.523166.30  918.9023348.70  918.7023501.70  918.2023698.90  919.4023874.70
GR 920.024017.30  920.4024254.10  921.2024446.90  921.2024505.80  921.4024643.70
GR 922.224827.20  922.3024913.60  920.5025041.70  920.9025103.70  923.3025114.00
GR 922.625194.10  923.5025405.70  923.5025470.90  923.4025625.80  923.3025659.00
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GR 922.025797.20  924.6025909.20  925.1026112.10  925.7026283.20  924.9026415.10
GR 929.726451.60  930.7026489.00
HD195.28      10
HE195.28

NC0.0320   0.043   0.030    0.10    0.30
X1195.38      9619399.5021161.00  675.00  595.00  539.38
XL                      18480.0021637.10
GR 929.317018.70  921.9017121.40  923.8017168.10  918.5017215.20  924.6017263.80
GR 920.017418.10  916.9017567.80  916.0017766.80  915.3017950.80  915.1018136.30
GR 912.618338.90  913.0018494.20  912.2018637.00  908.6018793.20  908.5018845.60
GR 919.218898.70  920.0018926.10  914.2018956.30  910.0018970.10  907.9019114.20
GR 907.819135.10  904.5019172.00  906.5019244.60  903.3019270.50  905.4019399.50
GR 903.119436.70  902.4019578.90  903.3019692.30  902.4019960.90  902.1020479.20
GR 904.120570.90  902.7020765.40  908.3020862.20  906.8020996.60  907.7021049.30
GR 905.721069.10  909.5021100.50  908.8021161.00  909.9021161.70  902.5021192.30
GR 904.721204.70  900.4021226.40  903.4021279.70  901.6021282.40  902.5021296.50
GR 907.521305.50  909.8021332.80  908.5021453.00  915.3021499.00  915.6021527.10
GR 902.321560.00  903.2021597.30  908.8021612.80  908.6021622.80  917.7021637.10
GR 917.421657.90  914.8021675.90  914.0021715.10  915.5021796.60  916.3021958.90
GR 916.322099.00  916.4022245.60  916.6022428.30  914.6022590.40  916.7022616.00
GR 916.922677.60  917.6022893.60  918.0023086.70  918.6023281.50  919.1023435.80
GR 919.623504.00  920.1023652.80  918.8023839.20  920.3024022.40  920.9024224.40
GR 920.824247.60  921.1024392.50  921.4024465.50  922.4024636.60  922.7024872.20
GR 922.725035.70  921.4025261.10  923.5025493.80  922.6025645.60  923.5025853.90
GR 924.025995.60  924.4026056.00  923.2026067.60  925.3026112.60  925.4026318.60
GR 924.426398.80  925.8026432.20  924.0026442.00  927.9026489.30  927.8026630.10
GR 930.126686.00
HD195.38      10
HE195.38

NC0.0320   0.041   0.030    0.10    0.30
X1195.47      9619358.6021053.10  485.00  530.00  472.11
XL                      18680.0021644.40
GR 929.717792.40  921.6017913.60  918.0018044.50  917.5018179.70  916.2018307.00
GR 915.018487.20  914.8018615.40  912.9018775.70  910.3018852.50  912.6018904.50
GR 911.318916.70  921.3018959.10  920.8018994.90  915.1019030.10  910.0019050.50
GR 906.619149.30  908.4019183.50  905.0019210.90  906.6019358.60  904.1019375.40
GR 904.319538.30  903.6019693.50  903.9019901.50  904.0020031.10  903.9020267.20
GR 905.820328.50  903.2020515.10  902.5020643.80  903.0020758.90  907.7020815.30
GR 907.120885.50  911.2020934.50  910.7021053.10  907.3021180.50  907.7021228.80
GR 906.121231.30  904.6021288.70  908.9021317.00  904.4021386.30  902.1021393.00
GR 904.521415.10  913.4021435.00  910.5021435.70  910.9021458.30  903.3021469.70
GR 904.421514.80  918.3021534.10  914.9021538.20  913.7021579.20  914.6021604.40
GR 916.721615.90  918.1021644.40  914.4021658.80  913.3021687.60  914.9021718.90
GR 915.421855.30  915.8022042.90  915.9022051.40  915.9022306.10  915.8022355.80
GR 916.022499.30  915.8022635.90  915.4022733.80  916.6022742.10  914.8022786.20
GR 918.622855.20  917.3023042.10  917.7023071.10  917.8023212.70  918.0023439.80
GR 919.023585.30  919.7023742.10  919.0023920.10  918.5024060.60  921.1024222.60
GR 921.324370.40  921.6024505.40  922.0024624.80  922.2024781.10  922.6024953.60
GR 922.725023.60  922.5025161.00  923.6025379.30  922.8025508.60  923.3025629.50
GR 923.725772.60  923.8025823.90  924.2025965.20  924.8026155.40  925.3026297.10
GR 925.526330.20  926.2026540.80  927.1026734.80  924.9026860.60  927.9026973.40
GR 929.826977.00
HD195.47      10
HE195.47

NC0.0320   0.043   0.030    0.10    0.30
X1195.56      9719147.5921437.70  395.00  580.00  509.15
XL                      19137.7021703.00
GR 929.218535.80  927.4018542.30  920.1018654.00  917.6018755.80  916.0018873.40
GR 914.618984.60  921.7019100.80  920.1019137.70  917.6619147.59  910.1019178.20
GR 912.019250.00  908.6019291.00  906.8019403.10  904.4019416.60  905.6019504.80
GR 903.819531.10  904.1019577.20  907.3019604.10  904.2019650.10  903.7019906.80
GR 903.420065.20  903.8020167.50  903.3020273.70  906.0020297.30  905.5020408.50
GR 903.920513.40  902.5020528.70  902.6020631.10  904.0020792.20  906.4020887.40
GR 902.820999.80  901.4021057.60  912.4021094.40  910.2021149.40  916.0021181.00
GR 911.321221.50  912.2021246.90  904.3021295.20  903.4021374.80  909.7021391.40
GR 912.921423.40  916.5021437.70  907.4021473.00  905.0021524.90  904.1021597.30
GR 905.921637.60  906.6021742.20  912.7021779.40  910.7021829.50  911.7021837.30
GR 911.421897.40  913.3022076.90  914.4022277.50  914.4022363.90  914.1022642.10
GR 914.222719.10  914.5022823.00  913.6022941.00  916.0022988.20  915.8023006.80
GR 918.223073.20  917.9023291.30  918.6023469.70  918.5023600.60  917.4023701.90
GR 919.223720.20  920.1023794.40  920.9023914.30  920.3024066.70  921.0024155.70
GR 920.624286.70  920.3024337.20  918.6024363.50  918.8024386.10  920.0024390.40
GR 919.124401.20  921.5024502.90  921.8024652.00  922.1024718.20  923.0024872.30
GR 923.225062.60  923.1025205.70  923.1025342.10  923.4025409.50  922.9025582.90
GR 923.025623.60  923.0025738.10  921.2025756.90  924.0025839.00  923.4025903.10
GR 923.426064.60  923.4026159.70  924.3026321.90  923.2026372.60  925.0026392.00
GR 926.026583.10  926.6026737.00
HD195.56      10
HE195.56

NC0.0310   0.043   0.030    0.10    0.30
X1195.66      9619611.3021280.80  435.00  525.00  491.32
XL                            21806.00
GR 934.819143.10  925.1019155.60  916.3019179.80  916.5019207.40  915.1019218.50
GR 910.619233.30  911.2019321.70  905.3019516.60  907.6019611.30  906.1019705.00
GR 904.419732.10  903.9019868.00  903.1020056.20  904.6020080.90  905.3020200.40
GR 908.320264.40  905.0020352.20  905.8020388.80  907.2020419.80  903.5020517.20
GR 903.420628.10  904.1020748.30  904.5020919.60  904.1020966.40  904.2021076.00
GR 904.121202.10  913.1021253.90  916.2021280.80  909.7021309.90  911.7021442.50
GR 912.321546.50  912.5021593.50  907.3021618.60  905.0021753.30  903.3021877.40
GR 905.321951.20  912.2021993.70  910.7022038.60  912.7022059.50  912.5022188.40
GR 912.522250.50  914.2022401.70  914.6022484.70  914.3022621.40  914.5022852.50
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GR 914.622860.60  915.7022997.10  914.2023140.50  913.0023168.90  915.9023192.50
GR 914.723196.20  916.5023206.50  917.3023332.30  917.2023356.20  917.7023527.30
GR 917.823554.70  918.6023743.40  917.1023884.10  916.0023915.00  918.0023925.50
GR 919.724073.90  919.9024195.90  921.0024322.10  920.8024429.90  920.1024543.10
GR 919.624583.70  918.4024589.60  920.2024661.50  919.2024778.80  920.2024877.20
GR 918.624898.90  920.6024929.30  921.5024930.60  920.0024974.30  920.3025077.50
GR 919.525112.60  920.6025122.80  920.8025262.30  922.5025444.00  922.6025557.80
GR 922.725577.10  923.4025697.90  923.7025875.60  922.5025931.60  922.7026005.70
GR 922.226047.30  925.8026065.90  925.2026120.50  925.8026255.70  925.7026336.60
GR 926.026478.00  926.0026669.20  926.2026717.60  926.8026916.00  927.4027089.00
GR 927.527225.10
HD195.66      10
HE195.66

NC0.0310   0.043   0.030    0.10    0.30
X1195.75      9619571.3021116.40  410.00  530.00  495.98
XL                              21916.00
GR 939.619463.80  925.1019500.60  919.3019520.20  911.3019571.30  910.1019676.70
GR 903.519775.10  903.4019944.50  903.4020000.30  904.8020041.40  903.9020133.90
GR 906.820171.60  906.5020236.00  908.6020307.10  906.5020407.50  906.5020409.50
GR 906.720515.50  908.4020580.80  907.9020698.40  905.4020782.10  904.8020902.40
GR 904.621067.00  913.8021116.40  913.9021166.40  910.3021196.00  912.6021227.90
GR 912.021348.20  915.8021409.70  910.6021477.50  910.4021581.30  910.6021674.30
GR 913.721693.30  912.8021743.30  913.4021768.80  908.5021815.70  908.5021927.00
GR 906.321970.60  907.0022044.80  905.6022085.00  907.6022169.00  912.6022204.80
GR 910.522241.00  911.9022270.80  911.5022356.00  912.7022386.20  913.0022549.20
GR 913.522640.60  914.0022753.70  914.2022920.70  914.3023027.60  915.0023181.30
GR 915.023305.30  914.1023415.40  915.1023438.00  917.3023444.40  915.8023457.50
GR 916.523482.70  915.3023497.30  915.4023608.80  915.7023644.90  916.8023791.40
GR 917.923917.40  917.9024052.80  918.1024177.90  918.4024251.20  916.6024364.80
GR 920.624486.90  920.7024513.70  921.3024671.90  921.5024764.60  921.6024880.70
GR 922.225031.30  922.3025116.30  922.3025234.10  920.3025338.50  920.8025420.50
GR 922.625453.10  922.4025605.90  922.5025626.70  923.5025829.70  923.0025872.40
GR 929.625909.90  924.1026019.80  924.1026136.50  922.6026215.20  924.3026226.70
GR 922.426256.80  925.2026274.00  926.7026345.10  925.0026384.40  925.5026535.40
GR 925.526539.00  925.7026730.40  925.7026776.20  927.4026936.60  927.5027063.50
GR 929.327093.20
HD195.75      10
HE195.75

NC0.0310   0.065   0.030    0.10    0.30
X1195.85      9719635.5020914.50  500.00  540.00  507.21
XL                              22041.00
GR 940.219590.50  923.3019617.10  919.0019622.17  907.7019635.50  904.5019641.30
GR 904.519747.90  904.7019906.80  908.3019969.40  905.2020040.30  905.3020187.20
GR 906.520321.30  906.8020398.30  905.7020522.40  905.4020631.10  907.1020674.50
GR 905.420807.50  905.5020882.80  914.3020914.50  913.9021001.10  909.6021073.10
GR 910.121145.20  918.5021146.50  910.1021152.00  910.4021273.20  910.9021393.80
GR 913.421527.00  915.4021666.70  914.2021740.70  915.6021809.40  911.8021840.90
GR 914.821910.90  911.7021928.50  912.8022054.50  911.1022082.70  910.5022211.10
GR 907.722244.20  910.1022399.40  912.9022435.00  911.3022475.60  912.6022485.00
GR 912.022516.60  914.8022629.30  914.6022790.20  915.3022933.50  915.5023036.10
GR 915.623172.90  915.8023277.20  916.1023421.30  915.8023619.60  916.3023686.60
GR 914.423741.80  916.1023770.60  916.6023927.40  916.4024087.80  917.5024243.60
GR 920.724381.70  922.5024496.10  925.6024544.90  927.1024614.70  918.6024706.90
GR 917.624834.40  920.6024936.80  920.4025010.80  921.7025177.50  923.1025331.80
GR 923.525490.00  924.7025666.20  923.0025769.70  925.1025807.90  923.3025826.20
GR 923.425964.40  923.4025980.50  909.7026103.50  909.4026138.60  923.3026165.70
GR 922.026177.80  909.4026205.90  908.0026229.00  910.6026308.90  924.3026358.00
GR 923.626428.60  927.3026556.30  927.0026701.60  925.6026825.00  925.6026961.20
GR 924.426973.40  926.6026993.50  922.4027121.70  922.4027249.70  920.9027351.50
GR 915.427429.80  913.8027528.70  921.0027561.30  923.8027695.40  924.8027807.50
GR 923.127903.60  930.0027923.10
HD195.85      10
HE195.85

NC0.0310   0.065   0.030    0.10    0.30
X1195.94      9719536.6120819.60  250.00  440.00  505.97
XL                              22182.00
GR 940.219522.40  920.5219536.61  910.0019544.20  906.2019554.50  906.0019654.20
GR 905.819843.90  904.5020021.30  906.5020047.50  907.5020128.90  905.4020167.20
GR 909.320237.90  906.1020309.90  907.4020413.50  908.5020431.70  906.9020464.30
GR 909.020478.10  907.4020616.00  906.0020783.80  912.6020819.60  909.3020954.30
GR 907.121036.50  910.6021068.50  910.0021211.10  908.9021315.70  910.1021404.30
GR 912.421439.40  911.5021517.60  912.8021679.90  913.0021821.70  912.5021968.20
GR 913.022106.90  913.8022125.00  909.4022139.60  915.6022228.50  910.7022380.20
GR 913.622498.00  912.0022553.20  912.0022605.50  909.1022640.10  911.1022700.70
GR 913.622730.80  912.0022766.50  913.5022934.60  913.2023068.70  914.1023142.80
GR 923.323190.80  921.9023230.00  913.5023331.60  913.6023496.60  913.6023507.10
GR 914.723674.70  915.2023901.80  914.6024079.90  915.8024241.20  917.7024388.20
GR 917.824564.80  919.1024691.70  918.6024823.60  918.3024974.50  918.2025142.50
GR 918.425166.10  918.8025369.60  920.0025520.80  920.1025655.30  926.3025799.70
GR 930.125936.10  926.2026033.20  928.9026057.60  928.6026089.90  932.2026162.90
GR 931.226320.70  933.0026411.90  931.5026550.70  929.3026694.60  922.8026825.20
GR 921.226843.80  922.4026888.30  927.5026928.50  928.8026980.70  921.6027082.70
GR 919.227097.30  919.4027244.80  920.1027430.90  920.3027460.70  920.4027618.20
GR 919.627820.70  920.7027960.20  921.8028155.30  922.3028263.10  921.3028344.30
GR 927.828406.20  925.7028476.30  922.9028491.90  924.1028691.70  924.0028830.90
GR 923.728882.20  930.5028917.80
HD195.94      10
HE195.94

NC0.0430   0.043   0.030    0.10    0.30
X1196.04      8519691.2020457.40  660.00  500.00  497.99
XL                              22240.00
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GR 934.418716.00  921.9018740.35  911.3018761.00  905.9018791.00  904.5018879.50
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GR 905.619215.50  908.5019251.50  907.3019254.80  910.3019300.10  906.3019366.00
GR 905.019461.50  907.8019468.20  912.2019516.70  908.1019613.80  909.6019654.00
GR 914.419691.20  913.1019706.00  908.1019729.80  907.2019822.40  906.2020109.10
GR 906.420268.20  906.5020378.30  910.4020398.10  914.5020457.40  908.4020534.70
GR 913.620595.40  912.2020739.80  910.6020904.20  912.1021017.20  906.2021054.90
GR 909.421124.30  909.2021280.10  908.9021309.00  909.3021443.60  910.4021628.10
GR 911.221792.20  912.2021959.00  910.0022076.10  912.1022237.10  911.3022375.90
GR 913.722516.80  915.7022701.40  916.3022718.00  916.7022876.70  916.6022906.20
GR 916.323104.10  916.4023126.70  916.4023263.10  916.6023420.70  917.2023650.30
GR 917.923816.30  918.7023961.10  919.4024152.70  919.1024226.30  920.3024364.00
GR 920.624426.70  921.4024598.70  920.2024739.70  920.4024877.70  920.4025013.40
GR 922.525176.10  922.0025376.40  922.4025532.20  921.0025707.80  920.2025795.30
GR 917.125824.60  917.4025874.50  926.4025955.50  921.5025993.70  923.0026139.90
GR 923.626188.20  920.7026196.00  920.7027762.80  921.1027904.50  921.9028097.30
GR 922.628241.80  922.7028404.50  923.1028598.20  924.1028769.30  924.2028782.00
HD196.04      10
HE196.04

NC0.0430   0.040   0.030    0.10    0.30
X1196.13      9519668.7020516.20  860.00  470.00  493.22
XL                  17919.7022507.00
GR 930.817603.20  920.1017750.20  916.9017891.40  920.6017919.70  914.4017964.80
GR 907.218074.70  906.9018221.00  910.5018257.80  910.7018335.90  906.2018444.80
GR 908.518483.50  906.0018540.30  908.7018599.30  907.8018750.40  911.6018885.30
GR 913.318901.00  906.3018947.40  910.8019091.40  912.2019236.00  911.5019273.50
GR 907.319301.90  904.9019384.10  908.1019399.90  907.6019434.80  915.2019469.80
GR 915.419620.60  915.7019668.70  908.2019754.00  907.6019876.40  906.3020122.90
GR 905.720274.40  905.3020387.50  911.0020420.20  911.5020460.50  917.4020516.20
GR 912.420645.90  914.4020819.40  915.1020983.70  914.7021169.80  913.2021281.20
GR 909.121358.40  911.3021513.00  910.7021682.70  912.4021847.60  913.5022049.70
GR 912.922239.50  913.5022402.20  914.5022596.70  914.1022693.70  915.6022934.70
GR 915.123086.30  915.0023286.30  915.3023443.40  916.2023669.80  917.6023805.90
GR 914.623872.90  919.8023947.20  919.6024215.90  919.5024329.60  919.3024518.60
GR 919.424549.90  920.3024721.10  921.7024946.90  921.9025100.50  922.5025275.00
GR 922.925474.70  923.6025665.20  924.0025822.20  923.5025997.90  927.0026039.90
GR 925.426076.40  926.6026114.20  921.5026137.40  920.9026234.10  920.7026306.00
GR 924.426312.40  926.0026388.10  923.1026431.00  920.7026443.00  920.7026569.00
GR 927.226612.40  924.8026721.50  927.0026871.30  926.8026994.80  922.9027071.30
GR 921.227218.10  920.1027385.30  921.2027552.50  920.9027683.60  924.1027825.90
GR 925.927859.30  925.2028009.60  926.9028211.50  926.5028368.30  928.6028561.00
HD196.13      10
HE196.13

NC0.0430   0.050   0.030    0.10    0.30
X1196.23      9719600.0020517.30 1365.00  460.00  505.25
XL                        22817.00
GR 928.417383.20  925.4017538.40  924.8017685.50  924.5017711.80  922.4917724.11
GR 916.517760.90  913.0017850.80  913.1017966.30  910.8018115.30  911.3018170.60
GR 908.018219.10  907.9018381.30  908.4018548.60  908.6018614.60  914.2018655.50
GR 911.018760.00  913.8018888.90  911.8019025.30  908.3019072.60  913.0019178.80
GR 913.319290.80  914.5019299.50  907.9019339.10  907.8019377.40  911.7019394.10
GR 910.019412.20  914.6019439.00  915.1019544.40  911.0019565.20  910.8019581.60
GR 913.819600.00  908.7019625.30  906.0019711.20  908.8019760.40  908.2020064.10
GR 908.120128.60  906.8020394.70  906.7020413.40  910.2020434.00  909.3020481.90
GR 917.920517.30  913.7020540.80  913.8020685.00  913.6020872.10  914.4021015.90
GR 915.021224.50  915.3021386.50  915.2021540.80  914.9021694.80  913.8021922.90
GR 914.021969.30  915.3022118.00  914.9022278.80  913.3022385.80  916.0022569.70
GR 914.922713.20  915.8022829.00  913.0022937.90  914.9023147.60  914.6023298.80
GR 915.923444.20  916.0023540.50  917.4023655.70  916.2023820.40  917.1024012.80
GR 918.424168.70  918.7024352.00  918.5024448.00  920.1024631.10  923.0024739.10
GR 922.624896.80  922.8025029.80  921.4025067.30  922.1025225.70  921.8025262.90
GR 921.825413.10  921.8025437.10  921.6025596.80  925.0025639.10  923.6025700.40
GR 929.025775.50  929.1025898.80  921.0025964.40  922.1026107.20  922.1026248.50
GR 924.126443.80  924.1026587.90  924.5026743.00  926.6026934.30  926.0027102.30
GR 925.627317.90  928.0027440.20  927.1027590.10  928.3027826.60  928.5028037.80
GR 929.028282.70  931.1028468.00
HD196.23      10
HE196.23

NC0.0430   0.032   0.030    0.10    0.30
X1196.32      9619776.9020577.60  535.00  495.00  514.33
XL                        23029.00
GR 929.317304.60  925.6017369.40  926.4017424.30  916.3017467.30  917.0017615.80
GR 920.017673.40  915.2017703.80  913.7017815.70  915.8017835.00  913.8018040.20
GR 909.518219.90  909.9018305.80  907.7018343.50  909.2018412.30  907.6018485.40
GR 909.018596.10  915.5018668.40  917.5018727.60  911.4018806.10  913.7018894.90
GR 914.719075.00  911.6019252.80  912.0019320.80  907.3019365.40  906.2019395.80
GR 907.819425.60  913.9019451.70  914.8019561.10  913.9019695.40  910.4019749.60
GR 915.519776.90  909.4019834.00  908.4020037.10  907.0020492.60  909.4020511.30
GR 911.220551.10  916.3020577.60  910.4020625.20  914.4020659.10  915.2020730.20
GR 913.020789.90  914.9021013.50  910.5021080.90  915.2021113.80  912.2021213.40
GR 918.521385.90  918.6021431.60  908.6021471.50  908.8021527.00  917.0021584.00
GR 918.021650.70  913.6021754.60  914.1021920.40  915.7022092.20  914.2022173.00
GR 915.322375.90  915.2022550.80  915.9022643.90  913.5022652.40  916.6022660.20
GR 916.722850.30  915.4023016.40  916.8023032.00  916.3023260.90  917.1023441.00
GR 918.323634.40  917.4023797.50  921.4023817.50  917.3023827.50  917.4023843.70
GR 919.224020.80  919.6024278.50  919.5024416.70  920.6024442.50  918.8024452.90
GR 920.524651.80  923.8024818.40  923.2025010.90  924.0025182.50  924.2025250.50
GR 924.925519.00  924.8025719.10  926.7025794.30  923.5025823.30  924.5025892.60
GR 922.626141.80  923.0026312.10  924.4026483.00  924.7026615.80  931.3026647.40
GR 929.026726.40  920.0026819.10  922.7026887.00  922.4027009.20  927.0027127.30
GR 929.427395.00
HD196.32      10
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HE196.32

NC0.0430    0.032    0.030     0.10     0.30
X1196.42       9619855.2020635.60  515.00  465.00  490.39
XL                                 23201.70
GR 932.217283.50  930.1017343.70  926.0017350.80  923.0017381.40  922.1017464.80
GR 919.017525.60  917.7017693.40  920.9017733.10  914.5017759.20  912.5017929.70
GR 912.918103.20  910.8018337.00  914.7018381.80  914.9018506.50  910.5018542.90
GR 911.818709.30  910.8018776.80  916.8018814.10  917.9018870.30  914.1018897.50
GR 911.818903.90  916.4018955.40  913.9019062.70  916.4019144.20  911.5019241.20
GR 915.419328.70  914.6019409.00  911.4019459.50  916.6019501.80  914.2019636.30
GR 915.519686.90  908.9019702.20  912.6019855.20  909.2019877.90  909.0020026.20
GR 907.920497.40  907.3020605.20  912.1020626.90  916.2020635.60  913.4020664.80
GR 913.220732.70  917.3020910.50  914.4021108.30  913.4021157.80  917.6021291.00
GR 909.421344.70  917.2021393.80  915.0021566.30  917.9021644.40  915.7021682.30
GR 920.121748.00  917.0021805.20  911.5021829.30  916.7021897.30  914.8021911.50
GR 916.222001.00  917.0022164.00  917.0022164.40  916.9022344.40  915.5022569.70
GR 916.922760.70  917.0022790.10  918.2022961.70  917.2023108.40  921.0023144.10
GR 915.223152.00  916.6023171.80  922.5023183.60  925.0023201.70  917.3023222.50
GR 917.923399.00  920.0023574.50  920.0023642.70  920.2023893.20  921.0024140.10
GR 922.024405.70  921.4024562.70  923.8024799.30  925.7025019.30  924.6025209.50
GR 924.725385.60  925.9025619.90  925.4025864.40  927.9025937.00  926.5025967.20
GR 927.726139.30  928.5026332.50  928.1026497.20  930.8026675.20  929.4026741.90
GR 930.726946.20  928.6027111.70  925.2027279.50  925.6027461.50  929.1027689.50
GR 930.427859.00
HD196.42       10
HE196.42

NC0.0430    0.025    0.030     0.10     0.30
X1196.51       9619835.8020733.20  495.00  550.00  498.40
XL                                 23432.00
GR 931.817314.60  924.5017370.30  920.2017501.70  920.7017664.70  922.9017828.20
GR 918.817864.40  922.5017920.60  919.6017996.60  920.4018047.90  915.8018078.10
GR 911.818248.10  911.2018441.50  914.1018472.70  913.4018587.20  914.8018680.50
GR 910.518703.60  913.4018829.50  911.1018899.90  916.7018941.90  918.9018972.70
GR 915.118987.30  914.0019095.50  915.3019142.60  918.8019154.10  914.9019182.80
GR 915.119354.50  916.3019436.90  912.2019551.70  909.2019764.10  909.0019788.00
GR 913.719810.40  914.3019835.80  910.5019873.70  909.2019934.40  908.8020279.30
GR 908.220507.70  908.2020705.90  918.9020733.20  917.2020745.60  917.5020791.40
GR 914.920884.90  917.8021131.50  916.2021297.10  915.7021460.90  917.7021648.40
GR 910.121717.90  917.3021774.90  919.0021907.20  914.9021932.10  917.0021952.10
GR 916.421977.70  918.1021989.70  915.2022006.90  917.4022169.50  917.9022330.30
GR 918.122383.10  917.8022553.80  916.7022747.20  919.7023029.70  919.8023285.10
GR 918.923336.10  919.9023364.00  915.4023376.30  917.0023387.70  924.2023406.80
GR 925.323432.00  918.2023458.10  919.7023608.10  920.0023823.60  920.1023877.80
GR 921.324096.50  921.4024280.10  922.2024555.20  921.9024708.20  923.1024804.80
GR 924.524987.90  924.5025203.10  924.8025398.80  925.1025585.50  926.2025790.10
GR 925.225952.40  928.3026066.20  927.3026329.30  927.7026461.30  927.8026664.30
GR 928.026898.50  929.4027075.10  930.9027178.40  931.2027350.50  931.4027390.70
GR 928.027443.60  929.6027493.70  925.9027599.90  926.1027779.50  928.3027949.70
GR 929.928149.00
HD196.51       10
HE196.51

NC0.0430    0.025    0.030     0.10     0.30
X1196.61       9719727.8020862.70  530.00  535.00  508.32
XL                                 23929.50
GR 932.517396.90  926.1017455.10  921.5017620.50  921.2017767.10  923.5017925.90
GR 924.118029.40  917.7018068.00  922.0018118.70  919.4018135.90  919.3418190.00
GR 919.218308.10  920.3018351.10  912.3018393.80  911.8018520.10  916.4018587.00
GR 913.618830.40  910.5018867.70  913.2018908.20  911.9019068.60  911.7019184.60
GR 915.919243.50  920.0019277.60  919.1019410.50  915.9019463.60  919.0019538.00
GR 917.019637.80  914.3019679.30  916.1019695.40  914.7019727.80  911.4019752.00
GR 913.119769.60  910.9019799.30  910.9019824.70  911.1020032.80  910.7020185.20
GR 915.720212.50  909.7020231.90  909.0020557.80  908.9020759.40  908.5020830.20
GR 918.320862.70  914.2020886.10  913.5021052.10  917.9021221.60  918.4021253.80
GR 916.821288.40  918.3021446.10  917.9021586.60  916.8021614.80  918.2021713.60
GR 911.821758.50  918.5021818.30  918.8021975.00  916.8022127.60  917.5022268.60
GR 918.622429.90  918.5022576.90  918.7022742.10  918.6022948.50  918.6022988.70
GR 920.223203.90  920.5023345.90  919.0023543.60  921.6023599.20  920.2023778.50
GR 922.323885.00  916.7023896.00  916.6023913.60  925.9023929.50  925.6023953.10
GR 919.823979.30  921.0024167.10  921.6024325.10  921.8024437.00  922.4024677.60
GR 922.124902.00  924.6024969.10  923.0025050.20  923.7025250.50  923.8025268.70
GR 923.725472.80  923.6025616.20  924.5025869.90  924.0026056.20  926.3026089.80
GR 925.026108.90  927.2026253.30  927.1026411.40  927.0026597.00  927.4026691.90
GR 927.526905.60  927.5027056.90  927.8027182.00  927.6027344.70  928.2027510.30
GR 932.127671.90  932.2027674.00
HD196.61       10
HE196.61

NC0.1500    0.025    0.030     0.10     0.30
X1196.70       9619929.7020968.00  500.00  520.00  505.46
XL                                 24641.00
GR 932.017573.90  926.0017644.90  924.3017782.70  922.4017843.10  923.8018020.30
GR 924.518134.60  919.8018267.50  922.2018319.90  919.8018331.20  921.0018435.60
GR 918.918556.80  915.4018641.70  911.7018711.60  915.2018760.80  912.4018869.50
GR 916.418902.20  911.7018965.30  914.9019049.60  912.3019154.60  915.0019175.70
GR 915.619236.90  913.2019292.70  911.8019488.60  911.1019652.70  912.2019862.70
GR 911.719880.80  915.3019929.70  910.9019950.00  911.3020122.40  915.8020202.00
GR 909.620219.30  912.8020273.50  909.3020434.40  909.5020550.40  909.3020737.40
GR 909.420923.40  919.2020968.00  916.4021188.40  914.8021194.20  915.8021385.70
GR 914.921544.30  920.1021731.40  920.4021896.30  916.5021959.90  920.5022031.00
GR 919.022071.70  920.6022279.40  920.7022401.80  920.6022565.20  921.0022751.70
GR 921.022937.20  919.5023104.90  921.0023207.40  921.0023369.20  921.7023560.00
GR 922.123702.60  920.3023758.80  922.7023813.60  921.4023873.10  922.4024075.40
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GR 921.224329.10  923.8024500.60  924.6024552.90  916.6024562.30  917.2024587.30
GR 926.024606.70  927.6024641.20  921.7024659.00  922.3024856.90  922.2024937.40
GR 922.925096.40  923.4025304.30  923.6025463.00  923.9025572.30  924.3025904.30
GR 924.526004.00  925.7026226.00  925.0026288.10  927.5026368.30  926.5026422.10
GR 928.526480.70  927.5026504.70  928.6026710.90  928.6026853.90  929.2027041.90
GR 929.427067.70  930.4027307.60  929.7027485.50  929.6027715.80  930.7027810.90
GR 928.827853.40  930.1028035.20  930.3028210.00  930.8028363.10  931.3028616.30
GR 932.028793.90
HD196.70      10
HE196.70

NC0.1500   0.025   0.030    0.10    0.30
X1196.79      9620015.4021032.80  530.00  375.00  454.29
XL                              24978.10
GR 933.317706.00  930.2017721.20  930.3017801.20  927.2017838.20  925.9018025.30
GR 921.718262.60  918.4018299.60  925.0018359.10  924.4018454.10  920.9018463.20
GR 918.618477.30  923.0018525.90  921.0018529.60  921.2018575.60  918.5018598.40
GR 920.318667.30  916.6018736.80  914.4018747.20  916.9018881.60  911.9018946.30
GR 913.619066.60  915.6019092.00  912.3019226.40  911.9019594.30  914.0019610.30
GR 912.119630.70  914.8019829.30  916.2020002.50  916.6020015.40  912.1020042.80
GR 912.720244.30  913.6020327.00  912.0020493.90  914.3020516.70  913.2020541.30
GR 915.820593.10  914.0020636.00  911.5020644.30  910.7020658.10  911.4020849.10
GR 911.421017.10  920.9021032.80  919.6021220.90  919.8021401.70  919.6021579.90
GR 919.021753.80  921.3021858.10  915.1022020.40  921.3022147.00  921.5022345.80
GR 921.522433.30  921.9022607.50  921.9022639.20  921.3022890.50  922.4023079.40
GR 921.623252.00  921.6023487.50  923.1023748.70  923.8023923.20  925.3023940.60
GR 924.524042.40  924.5024260.70  924.2024489.20  923.2024722.30  923.9024931.80
GR 926.824978.10  918.3024986.70  919.0025012.70  927.2025025.20  927.8025061.60
GR 923.625081.00  922.9025251.10  925.2025287.50  924.1025374.70  925.2025616.70
GR 925.825766.90  926.8026024.20  926.9026065.90  926.8026274.60  928.3026464.80
GR 930.126598.10  928.3026610.30  929.3026794.90  930.9026943.40  923.3026971.70
GR 922.627149.60  923.2027263.70  930.5027332.20  930.8027382.40  930.6027560.00
GR 930.427754.70  931.1027913.90  929.7028133.90  931.2028209.40  931.4028383.00
GR 931.828460.00
HD196.79      10
HE196.79

NC0.0430   0.025   0.030    0.10    0.30
X1196.88      9619932.4021089.10  610.00  370.00  502.13
XL                              25271.20
GR 934.317999.60  928.8018059.20  928.2018218.90  925.2018385.90  924.2018543.40
GR 922.918618.40  919.2018631.10  924.6018697.50  918.6018737.50  921.7018916.30
GR 917.319080.40  915.3019118.80  917.6019170.80  914.5019204.00  913.5019409.20
GR 914.119484.50  919.7019527.40  918.9019692.90  919.0019737.50  915.4019819.10
GR 919.919932.40  914.2019957.20  916.2020023.80  918.7020054.20  915.1020114.80
GR 913.620239.70  916.5020358.60  916.2020402.50  913.2020453.90  917.4020601.30
GR 914.920631.60  916.5020700.80  911.3020721.20  911.5020746.60  911.6020983.40
GR 910.821059.70  920.8021089.10  921.5021269.70  921.0021428.60  918.0021498.90
GR 920.821538.40  918.3021566.60  921.1021592.80  921.6021762.50  920.3021846.60
GR 920.122024.00  918.5022046.10  920.3022067.00  920.7022165.80  917.3022235.20
GR 923.322404.00  922.3022605.40  922.0022771.60  923.1022945.10  923.5023205.50
GR 922.823370.60  923.0023396.60  924.0023592.90  923.2023800.10  923.8023975.20
GR 925.424143.90  924.7024307.10  924.9024533.20  925.2024605.60  923.8024827.50
GR 923.824983.10  923.3025165.50  924.7025225.30  927.6025271.20  918.7025280.20
GR 920.125308.30  928.9025325.30  927.7025361.20  925.5025370.60  926.1025483.00
GR 926.625847.80  927.0026008.70  926.6026216.40  926.6026286.00  926.6026445.10
GR 930.126620.40  929.0026701.40  931.6026790.80  935.4026805.70  924.0026857.60
GR 924.926922.00  927.5026936.60  931.7027112.90  932.5027190.80  930.3027372.60
GR 931.427497.30  936.5027516.60  930.8027542.10  931.4027733.10  932.0027965.60
GR 933.028009.90
HD196.88      10
HE196.88

NC0.0320   0.025   0.030    0.10    0.30
X1196.98      9619861.6021143.20  600.00  290.00  490.37
XL                              25367.30
GR 936.918215.30  924.3018273.00  924.0018469.10  924.3018645.30  924.6018768.60
GR 916.718918.10  919.3019068.30  924.4019092.40  922.9019159.70  912.5019188.70
GR 913.319428.20  916.8019483.90  917.7019694.40  918.9019861.60  915.4020028.40
GR 915.220056.30  915.4020222.50  917.4020297.30  915.8020405.60  917.1020447.00
GR 914.620576.10  912.3020597.30  916.1020765.10  911.7020804.30  912.1020818.90
GR 911.120994.00  915.0021004.50  911.0021026.50  911.5021121.20  917.7021143.20
GR 923.821235.20  921.3021393.20  921.1021560.40  920.0021594.40  916.4021602.30
GR 921.521625.50  919.5021639.90  922.4021747.40  919.8021905.90  922.6021957.20
GR 921.122117.50  920.7022239.20  917.4022308.10  919.0022316.60  920.3022507.10
GR 923.122741.20  921.9022928.80  922.4023051.70  923.5023248.30  922.9023493.40
GR 923.223715.50  923.0023884.50  926.2024043.00  926.7024071.20  925.0024094.00
GR 925.424150.90  925.5024333.90  925.4024510.90  925.2024547.70  924.8024791.60
GR 924.524954.20  923.8025118.10  925.4025293.50  926.0025330.90  918.7025341.90
GR 919.825355.80  928.0025367.30  927.9025392.20  925.2025402.20  925.8025594.70
GR 926.325797.70  926.2025954.80  926.1026140.00  926.3026349.90  926.4026534.80
GR 926.726555.90  930.3026582.70  931.3026770.00  931.2026782.30  935.5026800.00
GR 932.226824.60  924.0026852.50  924.0026908.30  932.4026932.40  930.0026957.10
GR 932.327053.30  932.3027253.50  933.0027381.60  930.0027438.50  933.5027501.20
GR 936.527513.40  936.2027524.00  931.1027540.70  930.5027714.40  932.5027963.40
GR 933.228002.00
HD196.98      10
HE196.98

NC0.0320   0.025   0.030    0.10    0.30
X1197.07      9619850.5021182.30  605.00  345.00  484.35
XL                        18423.5025427.80
GR 935.618156.80  930.2018180.10  925.3018362.20  928.7018423.50  925.5018602.80
GR 923.418786.00  921.1018795.00  923.3018808.70  923.3018842.00  917.5018878.70
GR 916.018947.40  920.7019044.70  918.4019059.40  923.8019092.90  916.0019120.50
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GR 914.919354.00  914.8019373.30  920.3019404.20  921.4019462.90  915.1019541.20
GR 915.119704.50  917.8019850.50  916.4019957.00  917.0020276.50  914.9020465.20
GR 914.820616.30  916.1020694.20  915.7020773.90  913.9021011.70  917.1021168.40
GR 919.721182.30  919.2021373.70  919.1021432.90  914.0021484.60  913.2021649.10
GR 914.421812.60  913.5021837.00  923.6021936.90  921.3022044.50  924.5022092.40
GR 923.022239.50  924.2022292.10  915.7022399.30  920.4022509.50  924.2022529.40
GR 924.622608.40  920.6022698.80  923.5022959.30  922.2023007.40  923.9023276.80
GR 922.923442.10  922.8023446.90  922.9023630.40  922.9023697.00  922.9023858.00
GR 924.124027.30  926.9024073.00  926.8024172.80  926.3024369.60  925.1024553.40
GR 925.224729.60  925.2024912.90  924.7025105.30  923.9025322.70  924.1025342.40
GR 926.325366.80  918.7025374.70  918.8025391.00  925.6025402.40  926.9025427.80
GR 924.625437.50  925.5025515.70  925.7025693.70  925.7025722.10  926.7025983.40
GR 926.726005.00  926.7026209.50  926.5026374.00  926.6026551.90  930.4026707.40
GR 930.626797.90  935.5026818.60  935.8026827.50  930.2026846.20  932.0026862.40
GR 932.127030.10  931.7027100.20  934.0027147.70  932.3027308.30  930.8027500.30
GR 931.927515.10  936.8027545.80  930.5027568.30  931.4027782.70  931.2027968.10
GR 934.328024.00
HD197.07      10
HE197.07

NC0.0320   0.037   0.030    0.10    0.30
X1197.16      9719870.6021110.40  560.00  435.00  499.71
XL                              25662.00
GR 937.118108.50  930.2018137.30  931.5018144.20  930.7018162.70  931.4018223.90
GR 928.518237.80  929.5018417.00  926.7018587.40  926.8018778.20  922.4018941.40
GR 918.918974.10  915.1019135.20  915.9019155.80  913.4019190.10  914.6019343.50
GR 914.919509.60  917.9019662.50  916.7019753.80  918.8019870.60  917.3020027.50
GR 917.020480.80  915.1020631.00  915.8020703.50  914.6020795.30  919.4020851.70
GR 914.220883.30  913.9020936.50  921.6021110.40  921.6021302.70  921.5021458.00
GR 921.021623.90  913.7021687.70  913.9021903.90  916.6022051.50  915.0022052.80
GR 914.122238.10  914.1022267.80  922.7022371.70  924.1022461.00  922.0022506.10
GR 919.622523.20  919.5022545.90  922.9022557.00  925.7022623.10  922.6022676.00
GR 922.822699.90  924.8022707.30  926.5022768.10  923.0022940.90  924.8023015.60
GR 924.223204.30  924.3023378.90  924.1023533.60  925.2023685.60  924.0023912.30
GR 924.924062.60  926.4024072.10  926.3524130.00  926.2024313.50  926.0024527.90
GR 925.924707.10  926.7024865.00  926.8024958.40  924.4024969.00  925.9024997.40
GR 924.725166.90  925.1025394.90  926.9025400.40  927.5025428.70  917.9025436.50
GR 918.125451.40  925.5025462.30  927.0025485.50  925.3025494.40  925.4025654.10
GR 925.425664.30  926.0025853.20  926.1025924.90  925.8026148.20  925.9026228.30
GR 926.526440.60  926.7026597.50  929.1026761.90  930.2026817.50  937.7026872.40
GR 937.726963.90  936.4027118.90  937.7027188.10  930.8027343.30  931.0027401.50
GR 936.027430.10  936.2027508.70  930.5027534.30  931.3027765.30  931.4027922.40
GR 932.828041.20  934.7028062.00
HD197.16      10
HE197.16

NC0.0430   0.047   0.030    0.10    0.30
X1197.26      9619850.7021072.60  530.00  425.00  497.32
XL                          18243.7026126.00
GR 934.817801.00  930.4017892.60  931.6017994.20  928.1018058.30  927.6018221.20
GR 931.618243.70  931.3018281.20  928.0018297.70  927.5018434.20  926.7018669.70
GR 926.218892.50  922.8018975.40  926.4019067.40  925.0019104.50  915.5019137.80
GR 917.619172.50  914.8019386.80  916.9019396.90  916.5019486.60  920.6019512.60
GR 915.719538.80  918.7019642.70  915.3019720.80  917.3019722.90  919.2019731.10
GR 915.519772.40  919.3019850.70  916.5019874.50  916.7019952.40  916.7020329.80
GR 917.620495.40  921.3020543.00  919.4020688.60  913.8020859.60  915.0020872.10
GR 913.620893.20  915.2020976.20  924.0021072.60  923.2021288.70  921.6021523.70
GR 921.821759.90  917.6021800.40  918.1021862.10  915.9021892.70  917.8021938.00
GR 913.021984.50  914.2021989.20  913.0022054.60  915.8022064.40  917.1022191.40
GR 913.222221.10  918.9022323.70  915.7022347.20  921.2022389.80  923.3022573.80
GR 923.222785.40  924.0022930.00  922.1022976.10  918.1022997.10  924.5023135.50
GR 924.723374.00  923.8023620.10  924.5023839.60  927.1024100.40  928.2024223.10
GR 926.824410.60  928.5024611.60  926.0024805.90  928.2025011.80  926.2025062.10
GR 926.125292.20  926.2025474.60  919.1025483.20  919.1025496.80  927.6025509.40
GR 928.625530.70  926.2025537.50  925.1025599.60  925.3025844.00  925.2025865.20
GR 925.526141.90  925.5026355.70  929.3026534.30  929.5026755.10  929.2026846.70
GR 929.127103.00  929.5027428.10  929.9027699.70  930.5027984.30  932.4028089.60
GR 932.028356.10  932.3028470.90  932.2028775.90  933.0029043.30  932.4029287.80
GR 933.629325.00
HD197.26      10
HE197.26

NC0.0430   0.027   0.030    0.10    0.30
X1197.35      9619776.3021112.70  500.00  470.00  486.44
XL                          18324.8026454.00
GR 935.518240.60  930.8018251.20  928.4018263.00  931.1018279.70  929.9018324.80
GR 925.518345.00  927.3018561.20  926.7018792.10  927.3018852.20  923.9018895.30
GR 928.518967.10  930.2019103.10  925.9019166.10  918.3019200.60  924.3019314.90
GR 919.619357.80  917.6019553.80  917.9019609.40  920.4019655.50  920.1019776.30
GR 916.919808.00  917.2019903.90  919.3019934.50  918.1019953.80  918.0020040.40
GR 918.320257.00  918.3020474.40  921.4020498.10  920.7020615.90  917.2020648.70
GR 917.620816.10  914.2020836.20  916.7020875.10  915.2020971.40  919.0021003.90
GR 918.421014.30  915.8021023.10  914.6021069.10  924.1021112.70  922.2021346.70
GR 923.521583.40  924.1021797.70  925.0022016.70  923.7022181.60  917.8022244.60
GR 919.022269.40  915.4022302.60  915.9022509.20  917.4022590.40  924.9022704.00
GR 923.422750.00  925.9022791.10  918.1022940.30  920.8022963.10  924.9023081.60
GR 925.323284.20  925.0023498.50  925.6023825.60  925.7024049.00  928.3024154.00
GR 930.524168.70  929.3024229.10  928.7024462.40  927.7024663.80  927.7024862.80
GR 927.025060.30  926.1025323.90  927.2025517.70  919.0025525.30  919.2025538.00
GR 929.225553.50  924.9025611.80  925.0025820.10  925.0025850.80  925.5026112.90
GR 926.126363.40  927.0026523.60  929.4026564.10  927.5026606.20  929.2026808.50
GR 929.127066.20  929.2027229.70  929.2027435.10  930.5027705.40  930.2027927.40
GR 931.128099.10  932.8028115.40  931.0028191.20  931.7028289.20  931.7028581.10
GR 931.728617.70  931.9028889.70  931.9028935.30  932.7029272.80  931.9029344.70
GR 933.929383.00
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HD197.35       10
HE197.35

NC0.0430    0.031    0.030     0.10     0.30
X1197.45       9619792.4020905.20  520.00  490.00  502.18
XL                                26650.00
GR 939.918283.90  932.2018297.40  933.0018354.70  928.7018365.90  927.6018618.50
GR 926.418808.00  927.4018961.00  920.7019071.70  922.4019263.40  925.4019389.70
GR 924.319436.80  917.4019486.70  920.8019526.20  918.5019581.40  921.2019615.10
GR 920.319713.30  922.1019792.40  917.2020026.70  917.4020035.60  919.4020041.20
GR 918.520057.30  921.2020147.60  917.7020163.10  917.7020395.50  919.8020515.00
GR 917.420607.70  918.9020654.80  921.8020669.60  922.6020745.70  915.6020817.70
GR 916.320863.50  924.2020905.20  924.7020952.00  922.8020979.20  923.0021048.80
GR 916.121159.70  915.8021201.70  918.6021228.80  917.0021239.50  922.0021275.20
GR 924.621568.50  925.1021773.60  924.4021977.30  923.8022183.00  922.5022407.20
GR 921.622519.60  916.0022639.50  916.9022709.50  916.0022739.60  919.4022900.20
GR 918.823021.80  926.8023088.40  926.1023280.70  926.8023468.60  926.3023665.70
GR 926.323847.40  927.0024046.20  930.8024229.00  928.0024379.50  928.5024567.00
GR 927.924667.70  928.1024703.30  926.0024748.40  926.2024973.20  925.8025045.50
GR 927.525076.00  926.4025164.20  926.4025367.90  925.4025514.20  927.3025547.90
GR 919.025558.30  919.1025569.10  928.8025582.60  929.6025600.80  926.4025611.10
GR 926.125842.50  926.3025891.70  926.9026137.20  927.3026234.10  927.9026477.40
GR 928.326624.90  926.2026708.30  929.6026839.30  929.4027073.30  929.9027254.80
GR 929.927551.10  930.3027753.60  930.2027977.10  932.5028260.70  932.6028322.40
GR 932.428597.30  932.2028664.50  932.3028857.70  932.7029014.00  933.3029282.60
GR 933.629321.00
HD197.45       10
HE197.45

NC0.0430    0.030    0.030     0.10     0.30
X1197.54       9719752.8020873.00  510.00  535.00  483.58
XL                                26785.00
GR 935.218353.90  931.0018542.00  930.0018710.20  925.9018897.30  924.7019104.50
GR 921.919306.60  926.5019512.00  926.6019525.10  920.0019561.00  920.3019649.80
GR 924.119752.80  918.0019816.40  920.2019986.50  919.6020038.20  922.4020094.20
GR 916.920249.00  918.0020475.00  917.8020665.80  918.3020718.10  916.1020720.10
GR 919.920737.20  916.8020839.40  925.2020873.00  923.9021082.10  918.6021127.20
GR 920.721172.30  919.4021193.90  925.0021234.40  922.3021274.00  924.3021319.50
GR 918.021412.60  925.2021464.80  922.3021511.50  925.0021534.60  924.5021568.60
GR 917.421618.50  921.2021652.80  919.0021723.90  922.7021764.90  923.0021973.20
GR 922.922156.80  922.3022370.70  924.2022398.90  924.3022624.90  925.0022690.30
GR 919.722717.70  919.6022834.70  917.1022857.30  919.7022900.30  917.7022946.00
GR 920.623128.70  928.1023239.80  928.5023436.80  928.5023622.30  926.3023641.50
GR 925.923697.60  926.6023928.40  926.0024161.70  927.2024199.90  930.1024228.30
GR 929.124260.00  926.3024353.30  926.4024470.70  926.6024707.20  926.6024730.20
GR 925.925093.40  928.2025178.40  931.4025195.60  931.5025264.10  926.1025289.90
GR 926.625547.30  928.3025578.30  918.9025586.50  919.7025598.00  929.5025612.10
GR 929.925630.00  927.3025636.40  926.9025785.30  926.6026048.20  926.5026365.50
GR 926.926526.10  927.2026709.90  929.9026835.90  929.4027061.60  929.9027347.50
GR 929.727582.20  930.0027758.20  930.0027951.20  929.6028137.40  932.0028171.50
GR 931.128417.80  931.3028623.40  931.2028687.80  931.3028883.20  931.5028934.30
GR 931.529240.80  932.5029422.00
HD197.54       10
HE197.54

NC0.0430    0.031    0.030     0.10     0.30
X1197.64       9620051.7021043.70  510.00  575.00  532.05
XL                                26844.00
GR 938.718412.00  930.1018493.60  927.8018627.00  928.6018742.80  927.1018793.70
GR 928.218863.70  924.1019048.60  929.0019102.60  926.3019210.90  927.9019228.90
GR 925.419307.50  922.7019329.80  925.8019382.70  925.9019434.70  921.9019456.90
GR 925.819490.70  922.9019510.80  923.0019528.40  925.2019565.20  922.1019626.40
GR 925.219656.40  924.1019750.40  921.6019855.00  923.5020051.70  918.2020226.40
GR 918.620396.80  918.3020599.10  918.4020677.10  918.3020839.30  922.7021043.70
GR 924.321105.30  921.0021140.00  922.6021167.70  919.5021185.40  922.6021205.20
GR 921.021257.00  927.1021297.00  926.3021401.00  920.0021424.90  921.8021599.30
GR 920.421707.50  928.0021850.10  927.6022064.20  926.3022234.60  925.7022452.20
GR 926.422575.50  923.9022635.00  919.7022660.50  920.1022848.20  921.5022965.10
GR 919.622995.70  921.8023167.50  927.1023216.20  930.3023392.20  930.4023563.00
GR 930.423681.30  926.9023735.00  927.7023928.20  927.9024177.70  928.9024239.80
GR 931.324262.40  928.3024341.50  928.3024400.40  928.1024582.10  928.3024724.40
GR 928.524943.70  927.5025150.20  927.3025261.90  927.4025428.30  926.6025579.80
GR 929.325616.80  919.2025623.60  921.0025638.00  929.2025652.80  926.8025747.60
GR 927.226021.80  927.2026180.90  927.2026346.00  927.2026350.70  927.5026667.70
GR 927.926841.00  928.5026951.50  929.7027222.40  929.8027279.80  930.2027576.00
GR 930.127630.50  929.5027861.50  929.6028035.50  932.4028204.10  930.6028361.40
GR 931.428589.40  931.4028726.30  931.4028931.60  931.4029055.10  931.8029291.40
GR 933.229465.00
HD197.64       10
HE197.64

NC0.0430    0.033    0.030     0.10     0.30
X1197.74       9620161.6021170.70  525.00  510.00  522.82
XL                                26839.00
GR 939.218369.70  936.0018400.30  936.0018449.40  928.7018620.70  929.4018801.10
GR 930.718876.70  925.9018919.00  925.9019070.50  928.5019147.10  927.1019167.10
GR 929.719196.40  929.3019358.70  929.7019420.30  925.5019462.80  925.9019520.20
GR 922.419551.50  922.7019727.90  922.1019916.30  926.5019959.30  925.9019998.20
GR 921.620024.80  921.8020099.00  925.1020161.60  923.1020227.10  919.2020262.40
GR 920.420427.70  921.2020581.40  922.4020595.10  919.1020657.00  919.3020849.60
GR 920.420925.90  921.3021134.60  919.6021139.60  926.6021170.70  927.6021282.80
GR 922.021345.70  921.2021496.00  922.0021685.10  924.7021811.30  929.4021878.00
GR 927.922042.20  928.8022235.60  926.3022402.00  924.3022508.40  922.4022667.70
GR 920.122757.20  924.4022778.10  920.9022818.10  922.0022820.90  919.5022877.30
GR 922.622998.30  927.6023058.10  931.8023231.00  931.2023417.90  931.8023598.20
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GR 932.623729.20  928.9023779.20  929.8023944.20  929.9024120.10  931.1024283.80
GR 932.124347.70  929.5024381.10  929.9024512.70  929.9024675.70  929.9024892.50
GR 930.225074.60  929.7025347.70  929.4025542.50  929.2025654.30  920.7025659.60
GR 921.225679.70  928.9025689.10  927.9025857.40  929.0026035.90  928.8026116.50
GR 929.426399.20  929.6026471.80  929.8026710.90  929.6026891.00  931.3026997.70
GR 931.427173.30  931.4027229.10  931.2027515.30  932.1027842.20  932.1027982.60
GR 932.028174.40  933.4028273.30  933.2028488.50  933.3028508.00  933.5028834.40
GR 933.528892.80  933.6029141.80  933.6029226.90  933.8029448.90  933.5029527.90
GR 934.929557.60
HD197.74      10
HE197.74

NC0.0430   0.025   0.030    0.10    0.30
X1197.83      9620001.6021234.50  515.00  475.00  499.47
XL                                26815.00
GR 937.818231.80  928.9018257.10  929.0018407.40  932.6018471.40  930.0018572.10
GR 930.818745.00  932.9018926.40  933.5018995.00  927.7019038.20  927.5019197.20
GR 931.019350.50  931.3019407.40  922.4019436.00  923.4019590.80  922.0019697.50
GR 925.319733.00  925.2019894.80  924.9020001.60  921.4020046.10  919.6020115.40
GR 920.420274.20  921.2020431.20  924.5020464.20  925.4020626.80  925.2020764.60
GR 920.520841.90  919.9021078.20  919.7021190.60  929.4021234.50  928.4021413.80
GR 926.921574.10  922.3021676.30  923.3021816.80  925.7021837.10  922.8022000.20
GR 928.422056.20  925.8022176.20  922.5022230.60  929.8022328.80  929.2022370.80
GR 923.322433.90  924.9022513.00  921.9022677.00  920.4022741.60  921.6022847.70
GR 920.722907.00  927.8022943.50  932.2023053.40  932.3023248.10  932.0023447.80
GR 932.623619.50  932.6023813.20  930.3023990.30  930.3024173.30  932.0024329.80
GR 932.724383.60  930.7024396.10  930.5024565.00  930.4024723.80  930.9024779.40
GR 931.124976.00  931.2025069.60  931.0025312.20  930.8025336.40  930.7025518.90
GR 929.125676.70  929.3025688.50  920.8025693.40  922.4025710.40  931.0025723.70
GR 930.225740.20  928.5025743.80  928.6025798.60  929.0025955.30  929.2026014.40
GR 929.826274.30  929.9026344.70  930.8026625.10  930.8026800.60  931.5026955.50
GR 931.727088.80  932.1027243.40  932.0027474.50  932.5027635.10  932.3027840.20
GR 932.528068.30  932.3028233.90  933.2028403.20  933.7028678.20  933.4028908.00
GR 933.429077.60  933.5029180.90  933.6029345.80  933.8029521.80  934.0029605.70
GR 935.529613.00
HD197.83      10
HE197.83

NC0.0430   0.035   0.030    0.10    0.30
X1197.92      9619230.1021172.40  500.00  510.00  488.75
XL                                26797.00
GR 940.218191.20  936.4018223.70  932.1018236.80  933.1018243.40  931.2018254.00
GR 931.218425.30  933.3018610.60  932.9018846.90  932.9019048.70  930.3019072.20
GR 931.819093.00  930.7019230.10  923.1019266.60  923.1019372.10  923.0019598.90
GR 921.619804.40  921.4019862.50  923.5019905.40  921.7019971.20  925.0020033.30
GR 921.620045.70  923.1020203.70  925.1020246.30  920.6020307.80  924.4020357.50
GR 926.420554.30  923.7020730.40  922.3020984.80  921.9021145.60  921.5021155.70
GR 929.121172.40  929.1021356.90  927.1021520.10  927.4021683.50  924.1021845.40
GR 926.621870.70  923.5021903.80  926.1021929.80  925.4021937.00  923.5021940.70
GR 923.222081.50  924.7022083.60  925.3022267.50  924.8022293.30  927.2022337.00
GR 923.222493.90  923.6022644.90  921.5022697.30  921.5022757.50  929.9022810.40
GR 932.623004.60  932.8023164.70  932.9023355.30  932.6023559.00  933.3023719.90
GR 932.723817.40  930.2023885.70  931.0024055.00  931.5024231.60  933.5024386.70
GR 933.624420.90  931.6024424.90  930.7024498.90  930.6024681.50  930.6024722.00
GR 930.124976.10  929.9025040.60  930.1025249.80  930.2025390.60  930.1025629.10
GR 930.725722.00  922.4025725.80  923.2025744.80  931.9025757.10  930.3025830.80
GR 930.626008.80  931.4026229.90  931.9026358.10  931.5026757.80  931.7026919.50
GR 932.627066.70  932.6027324.30  933.6027571.10  932.9027749.90  933.3027891.90
GR 933.328082.30  933.3028251.70  934.4028402.70  934.9028565.60  934.8028634.20
GR 934.628872.40  934.8029049.10  934.6029292.40  934.6029469.40  934.2029588.30
GR 936.629631.20
HD197.92      10
HE197.92

NC0.0430   0.030   0.030    0.10    0.30
X1198.02      9619036.4021106.90  510.00  495.00  501.89
XL                                26757.00
GR 940.018153.50  937.7018336.70  937.7018357.80  933.1018427.10  932.3018468.40
GR 934.518476.30  932.2018695.60  933.7018884.60  932.5019036.40  923.0019059.20
GR 922.819096.90  923.2019278.20  929.2019357.90  923.3019375.90  923.6019421.20
GR 926.319459.00  924.0019476.50  927.5019522.80  923.0019612.00  928.7019634.30
GR 929.019669.40  923.4019767.00  924.6019790.30  928.1019814.00  929.2019887.30
GR 927.319926.40  926.6020002.00  928.0020039.10  924.8020069.70  928.1020313.30
GR 923.320533.50  924.7020537.30  923.5020726.20  923.3020976.30  923.1021090.00
GR 931.321106.90  931.5021144.60  924.8021186.30  930.3021220.90  930.0021416.50
GR 930.321620.20  924.1021744.60  924.2021927.70  924.7022120.00  922.9022335.10
GR 926.922432.30  930.1022451.10  927.5022495.80  932.1022684.00  932.7022891.40
GR 933.623097.90  933.4023287.60  933.1023471.10  932.5023667.90  932.8023865.80
GR 931.323939.40  932.0024212.70  933.9024397.10  933.9024656.20  933.2024794.20
GR 931.724803.50  933.3025005.00  931.3025131.10  932.7025294.50  930.7025606.30
GR 931.725753.70  923.7025761.40  923.6025775.80  932.7025790.20  933.7025801.40
GR 931.725809.20  933.0025823.50  931.4025883.50  932.3026097.60  932.6026158.60
GR 932.626386.10  932.7026457.80  932.4026687.20  933.2026878.70  933.1027003.70
GR 935.527012.00  933.5027063.70  933.6027320.50  934.3027595.50  934.5027836.00
GR 934.528117.70  934.0028301.80  936.5028358.90  935.5028613.60  935.5028714.60
GR 936.128896.20  936.0028970.80  935.9029212.70  935.9029433.00  936.3029614.30
GR 936.829659.10
HD198.02      10
HE198.02

NC0.0430   0.039   0.030    0.10    0.30
X1198.11      9618903.8021141.50  565.00  220.00  483.89
XL                                26690.00
GR 940.117902.00  938.8018077.60  937.6018285.20  936.0018436.30  935.7018635.10
GR 934.118787.20  935.8018894.80  931.1018903.80  928.1018923.20  923.5018939.70
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GR 923.519122.20  924.9019199.70  929.4019234.10  928.3019286.30  929.8019335.20
GR 924.219372.30  926.0019506.40  929.0019564.70  925.0019617.20  925.6019639.50
GR 933.519763.70  930.1019925.80  930.9020092.90  926.3020123.60  924.1020294.90
GR 923.720523.00  925.2020673.90  926.9020709.90  925.8020876.20  924.1020906.40
GR 922.421086.10  925.1021087.10  933.0021141.50  931.6021302.10  933.0021535.10
GR 924.821656.10  924.9021737.70  926.7021770.70  924.6021910.60  926.0021948.40
GR 924.622088.90  931.1022121.80  931.9022296.30  932.0022484.50  932.5022633.30
GR 933.422816.20  933.4023003.50  934.5023161.00  934.1023340.30  933.4023499.70
GR 933.523649.70  933.5023813.50  933.9023915.20  931.4023972.10  933.2024078.60
GR 933.824242.20  932.8024384.00  934.8024481.80  932.7024634.20  933.5024779.50
GR 934.325003.20  931.4025110.40  932.3025304.60  932.1025445.60  933.1025447.80
GR 932.025474.20  932.5025683.10  933.1025769.80  923.8025776.50  924.1025795.30
GR 933.825810.70  934.2025856.50  932.5025932.80  933.3026094.90  933.4026175.20
GR 932.926338.50  932.4026534.00  932.5026619.80  934.5026827.40  933.0027003.20
GR 932.527014.20  935.2027029.00  933.7027061.10  934.6027210.10  934.6027241.80
GR 934.927440.00  935.0027468.30  935.5027703.80  935.6027718.90  935.2027903.40
GR 935.227911.60  935.5028087.30  935.6028153.10  934.7028318.30  934.8028345.70
GR 937.128370.00
HD198.11      10
HE198.11

NC0.0430   0.029   0.030    0.10    0.30
X1198.20      9618811.5021091.10  570.00  395.00  493.64
XL                              26575.00
GR 942.618101.00  937.5018409.70  936.0018696.60  934.8018811.50  923.4018834.50
GR 924.418843.20  921.1018844.60  918.8018850.10  920.8018851.00  919.3018995.70
GR 923.219009.90  923.7019070.40  926.0019088.10  923.0019092.70  924.2019114.50
GR 926.019115.30  921.7019210.10  921.1019295.20  929.0019308.10  931.3019329.00
GR 927.719343.10  926.3019484.70  930.5019505.30  931.0019525.10  927.8019525.70
GR 934.519557.80  932.4019568.30  935.4019583.40  930.1019601.90  933.3019792.90
GR 926.619822.30  930.7019869.80  929.0019940.60  932.7020073.60  930.5020126.50
GR 931.020193.00  927.5020220.30  930.1020242.00  931.0020355.20  921.9020387.40
GR 922.020485.60  931.0020616.80  927.3020665.00  927.3020828.90  929.1020851.50
GR 926.920915.90  924.1020938.90  930.3020994.40  924.9021088.30  931.3021091.10
GR 929.921296.00  927.8021327.40  932.5021489.80  926.8021513.60  924.7021568.70
GR 919.221572.30  924.9021576.70  919.2021673.60  920.9021677.50  925.7021680.90
GR 923.721698.20  927.0021743.20  925.0021824.60  927.1021857.50  924.9021876.90
GR 926.121982.00  933.8022011.00  934.5022023.30  930.6022039.60  932.3022338.20
GR 933.522628.60  933.4022940.00  934.4023232.50  934.3023543.20  934.0023824.00
GR 934.024125.70  935.5024411.00  933.5024779.60  933.5025079.00  933.3025409.40
GR 932.925738.40  932.7025761.60  924.6025769.20  925.4025787.00  935.0025805.10
GR 933.226101.90  934.2026579.80  934.5026862.90  935.3027269.90  934.9027634.80
GR 935.127952.70  934.9028305.80  936.9028731.40  936.0029012.60  936.5029364.80
GR 937.329520.00
HD198.20      10
HE198.20

NC0.0430   0.028   0.030    0.10    0.30
X1198.26      9618711.6021257.80  320.00  260.00  300.40
XL                              26486.00
GR 942.617999.70  938.5018313.20  939.9018542.40  941.7018551.80  937.0018596.30
GR 938.418698.80  936.9018711.60  922.3018737.60  918.7018751.50  921.0019062.30
GR 920.219107.70  922.4019164.90  927.6019167.10  930.1019378.80  932.2019392.80
GR 929.919424.60  932.0019437.10  929.7019528.50  933.3019556.00  930.9019613.60
GR 931.319659.40  930.3019674.50  933.5019717.00  930.7019749.90  933.5019778.20
GR 930.419855.40  928.4019861.20  932.2019895.60  931.6020188.90  926.2020230.40
GR 931.820260.20  931.6020318.50  922.7020364.30  922.7020423.50  930.4020704.80
GR 927.520771.40  930.3020794.60  929.6020942.60  932.0021076.50  930.1021130.80
GR 933.621257.80  931.8021455.10  927.7021456.30  925.5021468.30  926.6021478.10
GR 919.221520.10  920.6021608.80  919.2021611.40  923.3021630.80  925.8021664.70
GR 925.821937.00  935.7022010.90  931.5022028.00  932.8022326.10  933.5022697.10
GR 934.223034.10  934.6023384.50  933.7023687.20  934.4023977.50  936.1024283.40
GR 935.424364.80  937.2024384.80  935.0024392.00  934.6024690.90  933.4024866.60
GR 934.625272.70  935.3025580.60  935.5025656.80  933.4025757.50  926.2025767.20
GR 926.025782.20  935.3025798.80  933.6025817.10  935.1025834.50  932.9025869.30
GR 933.626255.50  933.8026278.00  934.4026638.20  934.6026959.70  936.6027035.60
GR 934.927068.30  936.2027394.50  935.9027691.00  936.3028097.70  936.7028395.20
GR 937.128754.10  936.3029271.20  936.3029567.70  938.5029684.20  935.9029696.70
GR 936.430075.70  936.8030498.80  935.9030790.80  939.2030976.40  942.5030982.70
GR 943.530995.00
HD198.26      10
HE198.26

NC0.0430   0.030   0.030    0.10    0.30
X1198.30      9818604.7421002.80  200.00  210.00  200.38
XL                              26433.00
GR 943.618002.30  940.3018229.90  939.6018374.30  937.0118538.47  937.0018539.30
GR 938.818564.50  937.0318604.74  931.7018726.00  927.0018875.40  926.2018921.40
GR 922.118922.30  922.5018951.40  924.5018966.30  924.0019051.60  921.7019079.00
GR 923.919101.90  931.1019243.40  932.9019423.30  933.0019557.20  933.3019701.90
GR 933.019851.20  933.9020014.20  932.9020171.90  931.4020263.30  928.0020312.50
GR 927.320346.70  923.9020354.40  923.3020369.80  925.0020384.20  923.0020417.00
GR 925.620420.80  931.7020579.10  932.7020750.30  932.5020895.70  933.2021002.80
GR 930.721048.80  929.7021095.10  930.7021251.30  929.3021385.30  925.8021517.50
GR 928.321674.40  935.4021811.10  940.2021935.00  939.3022076.10  938.4022218.40
GR 935.422322.90  935.7022455.90  936.5022635.60  936.2022804.10  936.0022986.20
GR 935.823138.00  936.0023287.50  936.8023473.40  936.2023644.20  936.2023777.20
GR 935.423929.40  935.2024036.00  937.0024190.90  938.1024355.00  936.3024492.30
GR 935.324793.60  935.3024862.70  935.9025047.60  936.0025051.90  935.0025253.60
GR 934.925326.50  935.2025651.40  935.2025793.80  935.2025965.50  935.4026032.20
GR 935.726231.90  936.0026304.90  937.5026641.60  937.7026774.70  938.0026991.60
GR 938.327104.60  937.9027248.60  937.9027248.70  937.7027501.30  937.8027524.30
GR 938.227888.80  939.3028016.80  939.0028264.10  939.5028485.70  939.7028732.10
GR 939.828841.90  939.8029098.50  939.8029142.60  940.3029332.40  939.8029590.00
GR 940.029714.50  940.1029901.90  940.2030063.00  940.2030068.90  940.0030475.80
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GR 939.930520.70  940.5030695.10  940.8030779.00
HD198.30      10
HE198.30

NC0.0430   0.035   0.030    0.10    0.30
X1198.34      9318550.4021397.10  200.00  200.00  200.38
XL                    18491.5226353.00
GR 944.317998.40  940.7018237.60  937.5018434.20  935.4018443.80  937.8018503.60
GR 936.018544.30  932.5018550.40  927.1018642.00  922.8018663.50  924.2018796.30
GR 922.719122.50  932.6019290.10  934.5019296.60  933.3019484.80  931.1019672.40
GR 934.519862.90  934.0020051.00  932.4020231.30  923.8020253.00  924.8020403.60
GR 930.520483.70  931.0020683.20  930.4020923.20  931.0021042.50  927.8021088.40
GR 932.821170.00  933.2021397.10  931.9021420.70  933.0021448.70  925.4021477.40
GR 925.421835.00  939.6021880.90  939.0021897.30  932.5021912.90  935.0022096.10
GR 936.122282.10  936.2022471.70  936.2022664.50  936.4022902.70  935.8023102.00
GR 936.023285.00  935.1023509.40  934.8023728.90  933.1023928.90  933.4024125.40
GR 933.224353.00  938.2024408.70  934.3024472.60  931.3024484.10  934.9024681.10
GR 935.324881.80  935.4024895.70  935.0025082.20  937.2025187.50  935.8025406.80
GR 935.825594.20  935.9025747.90  927.9025763.00  927.2025771.60  935.2025791.80
GR 934.225857.30  935.0026053.70  935.1026238.90  935.6026476.40  935.5026747.90
GR 936.326996.70  937.2027023.90  935.1027049.40  936.1027095.10  936.5027276.40
GR 936.827463.20  936.7027548.00  936.9027772.20  937.4027819.50  938.0028046.00
GR 937.928255.80  938.3028532.20  938.4028738.70  938.0028924.50  938.1029148.20
GR 938.429364.30  938.7029604.30  937.1029688.30  939.4029697.60  937.8029731.10
GR 938.229942.80  937.9030193.00  937.4030434.00  937.8030662.00  937.1030914.00
GR 939.130937.60  936.8030948.70  939.4030955.00
HD198.34      10
HE198.34

NC0.0320   0.044   0.030    0.10    0.30
X1198.40      9618487.0021394.60  365.00  450.00  308.13
XL                    18487.0026263.00
GR 944.118085.70  932.6018260.50  929.3018368.90  929.6018437.20  935.5018453.20
GR 934.318487.00  933.2018516.10  922.1018637.50  923.4018819.50  922.3019062.70
GR 922.819101.50  925.5019112.60  924.9019173.40  931.0019226.10  932.3019425.70
GR 933.119615.10  933.7019825.30  933.1020032.00  930.5020160.00  923.3020176.00
GR 921.520191.60  926.6020365.50  930.6020425.90  930.9020680.70  931.2020860.30
GR 930.921036.90  933.5021241.60  934.4021394.60  930.3021450.80  925.4021477.50
GR 925.421782.00  940.1021828.20  939.1021844.60  933.4021858.70  934.1022035.40
GR 934.722233.60  934.8022443.20  935.1022629.00  935.7022823.40  935.4023017.30
GR 934.323115.40  934.9023288.40  934.3023468.90  933.9023643.10  933.8023839.90
GR 933.324001.20  935.2024042.90  935.1024217.50  938.9024395.00  939.0024438.40
GR 936.024487.60  936.4024668.30  937.0024859.00  937.7025069.80  937.3025249.30
GR 937.325339.80  936.7025591.80  938.2025745.50  928.3025751.80  928.2025765.40
GR 934.925784.70  937.5025820.10  936.7026038.60  937.0026365.10  937.4026536.50
GR 937.026790.20  937.1026965.30  936.7026994.90  937.3027189.10  937.6027433.40
GR 938.127509.00  938.8027707.30  938.8027773.00  938.7027969.80  939.1028150.10
GR 938.728322.70  939.3028557.70  939.3028584.70  939.1028779.10  938.9028826.60
GR 939.529042.80  938.9029229.20  938.8029414.40  938.8029426.80  938.8029600.30
GR 939.529668.70  937.9029874.50  938.0029889.60  939.1030114.50  939.0030169.30
GR 938.030428.00  938.1030500.10  937.9030724.20  938.5030901.30  938.7030943.80
GR 940.130949.00
HD198.40      10
HE198.40

NC0.0430   0.036   0.030    0.10    0.30
X1198.49      9818537.8121390.23  390.00  465.00  488.90
XL                    18537.8126136.00
GR 949.717755.34  945.5917770.30  946.9317800.16  947.4417861.22  944.9417874.45
GR 945.517965.33  938.1618046.43  929.5218121.16  928.8818215.68  929.1818299.75
GR 928.518424.76  929.2418492.42  934.4018515.22  933.2818537.81  931.3018577.61
GR 925.818631.64  923.6018760.72  922.6218982.39  922.9419182.33  925.8919351.96
GR 928.519399.75  925.6019456.17  923.1919485.40  929.8319519.97  930.2419596.60
GR 932.819738.61  933.8019854.32  933.3219980.66  932.3120027.43  923.0120083.14
GR 922.420262.39  923.1020303.41  930.2020339.29  930.5920561.33  931.8520796.14
GR 931.521035.66  933.8021268.58  934.1821390.23  929.7621457.58  922.6021475.38
GR 921.621542.58  922.8021622.71  925.0621702.95  921.9021759.84  921.7021794.10
GR 939.921856.69  938.0021874.44  933.6321886.78  935.5421951.56  935.8222253.13
GR 935.722370.01  936.4022476.75  936.8122822.48  936.3523016.03  936.6223062.09
GR 935.123105.24  936.8023143.09  935.6523245.35  934.8023435.31  934.4123781.14
GR 934.823931.33  935.2023966.76  933.1523987.27  934.3924109.53  933.4124170.94
GR 933.624310.79  934.4024363.82  938.1924425.56  934.5724461.02  935.7424612.88
GR 934.524910.53  935.2025129.73  935.1725491.48  935.6725640.05  936.5825703.34
GR 933.725752.92  934.5025851.97  935.5626653.82  936.3426923.59  936.5127001.99
GR 937.027140.30  937.0027565.53  938.4328008.37  937.9628253.82  938.0728316.00
GR 937.328349.05  938.8028392.26  937.9028672.32  938.4728984.93  937.4629472.01
GR 938.229602.06  939.4029654.22  936.6529705.67  937.1529935.94  936.6830217.22
GR 939.030423.24  938.8030899.22  940.2630938.03
HD198.49      10
HE198.49

NC0.0320   0.025   0.030    0.10    0.30
X1198.59      9218759.8421264.23  530.00  500.00  505.62
XL                    18713.8825970.00
GR 947.017724.25  947.1917789.73  946.0017800.13  948.1517847.01  946.0417912.24
GR 940.118012.50  930.9118096.94  930.1518180.69  929.1618444.37  930.5818660.62
GR 934.618692.11  933.7518713.88  931.9518759.84  925.6018859.05  922.0819034.63
GR 923.019200.07  924.6019289.52  922.9019394.98  925.4919501.17  924.9619621.03
GR 929.419661.45  931.6019728.57  933.7719849.99  927.9119917.24  927.9119967.92
GR 924.520020.15  922.0020041.11  922.3920169.97  925.4020208.55  931.0020234.06
GR 930.420344.48  930.3020439.59  932.6120699.41  933.2220919.20  934.8921031.32
GR 934.221148.48  935.9021264.23  930.2521364.61  927.2321457.83  925.1221485.30
GR 925.121642.81  925.1021708.96  922.5121814.48  923.2921906.90  940.1621973.94
GR 936.322011.46  935.2022093.36  935.9222330.76  935.2822489.04  935.5822918.70
GR 935.923156.34  934.9023391.38  935.6023510.20  935.2523747.12  935.2923881.14
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GR 934.323997.78  935.5024165.65  934.7124179.90  936.1424283.54  938.3924354.62
GR 937.724421.26  935.1024455.89  935.2524674.11  936.6624985.12  936.7025438.03
GR 935.225599.26  936.6025708.37  935.6525748.59  935.6125905.13  936.5226132.99
GR 936.726821.26  936.4026941.93  938.1126975.35  935.9327002.06  936.6127092.18
GR 936.827275.66  936.8027613.98  937.2627983.86  937.4228257.51  940.4428320.24
GR 938.028354.09  938.8028568.46  939.3728880.09  939.3129142.27  938.3529396.34
GR 938.629584.70  938.2029619.78  938.7929750.26  938.7130401.83  937.9930619.62
GR 937.630895.23  938.8030923.31
HD198.59      10
HE198.59

NC0.0320   0.025   0.030    0.10    0.30
X1198.65      9518868.6521146.23  300.00  390.00  326.88
XL                    18868.6525864.00
GR 947.317689.87  945.9417760.42  950.4217808.66  945.8218103.85  945.2618174.39
GR 940.118232.20  934.7718320.61  932.9818412.42  932.9418564.30  933.3318610.84
GR 935.618674.59  935.2118789.53  930.5418861.64  930.8518868.65  931.8918892.49
GR 929.018989.85  924.6019066.24  922.9119150.31  922.2519335.17  925.5519404.17
GR 922.919473.83  923.2019608.10  927.8619786.44  930.1519847.34  927.7519957.38
GR 922.620038.91  922.0020147.60  923.4220167.30  931.1520199.48  931.6920383.52
GR 931.620437.12  933.1020554.55  932.8620669.63  933.0120909.70  936.0521146.23
GR 935.221176.79  935.5021246.35  929.3621314.02  926.7721405.83  926.9321470.20
GR 925.021526.13  922.6021636.00  926.9021701.83  924.9721843.38  922.6321899.93
GR 923.421941.61  940.6022005.91  936.2822047.81  935.6822208.11  936.3122326.26
GR 935.622448.66  935.4023039.14  936.1423268.82  935.5823389.80  936.0323641.12
GR 936.123863.56  934.6023983.04  935.2224156.63  936.3524175.20  935.6124285.66
GR 937.824371.34  938.7024404.21  935.9624484.10  936.0824565.77  936.8225255.33
GR 936.825488.47  935.0025596.50  937.8025645.50  936.5925688.12  938.6825701.75
GR 935.625758.68  936.7026026.97  937.4026299.86  937.0326839.32  938.1026978.12
GR 937.027021.39  937.7027250.17  937.5127755.64  938.2027970.68  938.1828039.74
GR 939.328171.00  939.0028245.80  938.6128280.35  940.0528317.01  939.0728376.00
GR 939.528650.57  939.5029440.03  938.7829578.12  939.9529600.38  939.3529823.08
GR 939.230150.88  938.9030388.61  939.2330669.62  938.1330861.19  940.1330918.48
HD198.65      10
HE198.65

NC0.0320   0.033   0.030    0.10    0.30
X1198.73      9219013.9221107.23  500.00  290.00  417.70
XL                    19013.9225791.00
GR 951.717720.43  949.6917824.93  947.1418087.38  944.6818282.25  944.5418431.09
GR 940.418667.05  937.6618862.03  931.4718981.64  934.4319010.28  934.0619013.92
GR 925.419098.86  922.5019166.08  922.0819445.29  927.4719522.33  926.1519619.44
GR 927.019696.60  922.4019875.43  922.1520064.49  922.9820256.74  931.8920302.61
GR 932.520446.53  933.9020629.59  933.7220749.35  934.5220886.25  934.3520988.87
GR 936.821107.23  933.9021174.45  930.1021238.52  927.5221260.98  926.9321340.97
GR 930.921410.02  932.1021453.86  926.7621514.39  924.0721570.66  926.7121655.19
GR 924.921751.32  924.6021856.65  923.8621903.15  924.3521943.08  941.0622002.64
GR 940.022022.41  936.4022030.45  936.8022194.48  936.4722285.66  937.1422408.01
GR 936.022680.95  935.7022876.18  936.0923227.89  935.6023348.83  937.2023467.65
GR 937.123716.45  937.7023862.35  935.8123955.32  934.9924056.73  937.5224155.75
GR 937.624230.33  938.6024314.58  936.9424470.85  938.5524583.26  937.3224690.36
GR 937.924933.66  937.4025208.56  936.5825348.49  937.4025580.06  938.2025653.26
GR 936.725835.04  936.4025918.79  937.0726367.79  937.6726749.47  936.8126833.04
GR 939.026931.96  936.9026977.91  937.6427187.22  937.5427534.38  938.2627691.81
GR 938.728119.68  939.3028242.26  939.4928508.53  939.8528769.85  939.4629111.44
GR 939.529364.70  938.8029493.06  939.9929550.95  939.2729596.33  940.1729618.24
GR 939.229722.02  939.5030148.07  939.7230457.43  939.4030746.85  938.9430815.29
GR 941.130878.37  943.1030891.30
HD198.73      10
HE198.73

NC0.0320   0.039   0.030    0.10    0.30
X1198.79      9118926.1820976.10  310.00  290.00  330.90
XL                    18926.1825576.00
GR 952.017662.07  949.4317806.27  947.3317906.39  946.1318028.27  943.5718105.01
GR 941.618236.33  941.3618369.13  936.7518643.12  935.4618779.75  932.9618838.93
GR 936.518894.85  930.7318926.18  930.3518928.26  927.6618964.21  925.2619035.90
GR 925.119150.84  923.5019331.86  922.1019512.39  923.5419622.00  923.1719734.03
GR 923.819837.78  922.7020040.14  922.4620119.94  924.0420256.23  928.8120287.14
GR 933.320427.84  935.1020736.89  934.9520856.17  936.9720976.10  930.0321114.63
GR 927.221131.45  930.2021230.47  929.9221295.79  930.8721331.41  929.9921419.86
GR 928.821463.40  926.9021488.26  924.7121576.83  924.9721676.75  923.7421765.33
GR 926.521847.11  941.5021893.36  941.0821910.30  937.4321925.42  939.7622124.89
GR 940.322299.19  938.9022507.25  939.2923171.00  939.0023419.10  938.9623674.10
GR 938.723803.00  937.8023850.98  937.9924054.58  939.5024167.19  938.4924303.23
GR 938.224437.08  938.7024461.18  937.5224649.81  937.5724837.67  936.9624942.03
GR 936.525224.07  936.8025348.55  937.8925378.05  938.3225450.00  938.7325518.81
GR 936.825596.52  938.2925695.10  937.2025755.71  938.1625970.11  938.3026242.78
GR 937.926570.56  937.5426745.24  938.7026811.98  937.3926824.98  936.9726877.54
GR 939.027461.36  939.0428056.27  941.1028116.67  939.1228168.81  939.5428443.25
GR 939.529144.81  939.0229356.00  941.3029418.80  940.0429477.98  939.8329794.12
GR 940.129945.27  939.5130009.41  939.5030411.16  939.6530630.71  941.2130724.62
GR 943.430769.25
HD198.79      10
HE198.79

NC0.0320   0.025   0.030    0.10    0.30
X1198.86      9118775.5020709.82  350.00  295.00  367.41
XL                    18775.5525340.00
GR 950.218195.70  944.2318235.75  942.1718336.62  941.5818448.46  937.6518622.94
GR 934.918725.02  934.8518754.50  933.7618775.50  930.2518843.36  927.5718984.76
GR 927.519028.12  926.0019120.25  925.3419187.52  926.7319367.06  924.5219454.24
GR 925.019531.22  923.8019561.75  923.3619900.12  926.7019922.70  923.2419935.42
GR 922.719989.24  924.6020118.36  930.1020153.46  932.4520212.55  936.9720244.48
GR 949.920293.61  935.1020317.21  933.6220424.91  936.5720709.82  936.0720826.98
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GR 932.720890.28  929.8020981.84  928.7921043.04  931.6521127.67  931.1421227.73
GR 929.321345.18  926.8021426.48  926.0121430.49  926.9221537.91  925.2921618.98
GR 925.521712.42  926.4021763.08  942.5921812.74  937.1321849.04  936.6222006.59
GR 937.522245.48  937.7022619.48  938.9223069.76  939.1223326.52  939.2323545.71
GR 937.023669.30  938.4023774.74  937.3823848.19  936.9223951.01  940.1824039.97
GR 937.624098.06  938.1024222.33  937.9924335.39  938.5624555.72  938.8224872.52
GR 938.525167.43  937.6025237.22  939.5225312.35  938.9925371.62  936.8725475.45
GR 938.125542.39  937.0025567.21  937.8225779.48  938.2426070.96  937.6826314.58
GR 938.026593.88  939.5026652.31  937.4726671.95  937.9726698.23  939.1227190.74
GR 939.427560.24  940.0027870.48  941.4027974.17  939.5928004.07  939.9728078.45
GR 940.328403.77  939.9028999.11  940.1029218.03  940.0029285.93  941.5029348.88
GR 940.329373.76  941.1029617.87  941.1629920.02  941.4330493.34  941.6230563.35
GR 944.030592.10
HD198.86      10
HE198.86

NC0.0320   0.025   0.030    0.10    0.30
X1198.96      9218882.0020560.00  510.00  510.00  539.93
XL                    18882.0024966.00
GR 954.418119.70  942.2518194.30  940.5818311.44  938.0318519.73  938.5918594.13
GR 934.818683.31  934.0418748.32  932.2418802.65  930.1018829.01  928.4718882.00
GR 927.618910.78  927.5019245.27  924.6119399.43  928.2419416.06  924.4319423.00
GR 927.419524.44  927.4019674.38  925.9419809.36  927.2919993.68  927.2620063.61
GR 929.120067.28  925.8020111.19  926.0020160.27  936.2420258.75  935.7320494.99
GR 936.220560.00  936.6420612.15  935.3020675.45  932.5420745.64  928.2820879.06
GR 933.520996.13  932.7521149.05  927.6021215.66  928.4421310.61  925.6221380.85
GR 925.321463.91  928.1721546.69  941.9021596.72  937.5321624.33  936.5821696.33
GR 937.821914.13  937.5322027.74  939.1022151.69  937.9622289.52  938.7722619.92
GR 938.522734.01  939.7223119.00  939.9023330.90  937.4623450.62  937.6423565.98
GR 938.623634.32  937.4623725.57  940.8023815.06  938.4123886.31  938.1824040.18
GR 938.724180.31  938.0124341.79  939.4024584.97  939.6324884.60  937.8525015.52
GR 941.725089.24  938.7125152.66  937.3025250.24  938.4325319.28  937.4425360.97
GR 937.525460.36  938.7425670.17  938.4025781.98  938.8726067.93  938.8726202.46
GR 939.926403.72  938.9526453.28  938.3026585.77  938.8926697.20  939.6326987.37
GR 940.527182.66  940.2327725.13  941.7028119.65  941.6228484.58  941.1028841.24
GR 942.429028.42  941.5829107.19  942.1029174.98  942.0929307.20  942.6729470.78
GR 942.229612.18  942.4429914.47  943.0030076.12  943.0430182.32  941.8330309.66
GR 944.730371.36  947.0930385.88
HD198.96      10
HE198.96

QT     1
NC0.0320   0.025   0.030    0.10    0.30
X1199.07      9619030.0020558.04  560.00  605.00  546.65
XL                    19030.0024600.00
GR 940.418402.04  940.0318479.23  929.9418569.32  928.9318677.44  929.4218779.11
GR 929.318868.00  929.3018871.74  929.5118928.11  929.4519013.82  929.7819030.00
GR 931.419110.77  931.0619278.97  923.5019313.24  924.4319371.07  927.2319425.69
GR 926.319470.69  934.9219536.38  937.0019568.85  934.9119604.60  927.2419664.72
GR 929.819727.26  928.0219782.09  929.8019832.79  927.2019877.13  927.2019904.08
GR 929.719935.17  929.5519961.40  927.0019994.75  929.3820207.70  930.3220270.76
GR 928.720360.06  930.9720437.07  931.4020558.04  929.6920594.34  927.1820697.54
GR 930.320796.98  931.6420908.71  930.5020997.29  927.3121094.13  926.0621186.49
GR 928.221273.67  928.5721334.59  943.2021387.11  938.8521416.13  937.6821473.29
GR 938.021709.87  938.3921838.70  938.1022044.79  940.3922287.75  940.6822415.78
GR 940.522512.75  941.0522645.45  940.9022867.04  941.4623000.65  940.9023110.00
GR 939.223230.90  942.0323341.25  940.5023417.70  939.9523498.75  942.4123607.03
GR 940.423699.31  940.1523863.47  940.5024156.51  939.2224512.01  939.4424681.42
GR 938.724762.83  940.3324796.09  940.7024849.20  938.7125014.31  939.0225083.55
GR 939.525185.57  939.4625402.55  939.1025737.69  940.2026120.98  940.0726275.36
GR 941.026477.35  941.5826822.80  941.6027370.77  942.2927498.03  942.7227555.28
GR 941.927588.36  942.8627848.57  942.9028645.85  941.7628759.81  942.7428835.29
GR 946.028898.80  943.8428937.43  944.0029191.13  943.5929523.28  944.1929704.73
GR 944.229893.18  943.7929987.33  944.9030075.22  946.4830127.19  949.6530151.97
GR 953.530168.74
HD199.07      10
HE199.07
EJ

T4  Yang's Stream Power Function
T5  See notes at beginning of model
T6  Inflowing sediment developed from USGS data
T7  Bed Material developed from field samples
T8  ************************************************************
I1            25
I2  CLAY       0       1       1    2.65    0.02              78       30       16
I3  SILT       1       1       4    2.65    0.02              82       65      5.7
I4  SAND       4       1      11       0       0       0       0        0
I5             0       1       0       1       0       0     1.0        2
LQ     Q    1500  160000
LT    QS    135023500000
LF CLAY1     .60     .60
LF SILT1    .075    .075
LF SILT2    .075    .075
LF SILT3    .075    .075
LF SILT4    .075    .075
LF   VFS    .020    .020
LF    FS    .020    .020
LF    MS    .020    .020
LF    CS    .020    .020
LF   VCS    .010    .010
LF   VFG    .010    .010
LF    FG    .000    .000
LF    MG    .000    .000
LF    CG    .000    .000
```

```
LF   VCG    .000    .000
LF    SC       0       0

PF        178.61     1.0     130   3.072      98   1.227      90   0.968      80
PFC .786      70   0.675      60   0.580      50   0.502      40   0.431      30
PFC .361      20   0.277      10   0.100       5

PF        187.24     1.0     130   3.072      98   1.227      90   0.968      80
PFC .786      70   0.675      60   0.580      50   0.502      40   0.431      30
PFC .361      20   0.277      10   0.100       5

PF        190.05     1.0     130  17.866      98  12.299      90   8.390      80
PFC 4.25      70   2.686      60   1.575      50   0.753      40   0.569      30
PFC .456      20   0.329      10   0.244       5

PF        199.07     1.0     130  17.866      98  12.299      90   8.390      80
PFC 4.25      70   2.686      60   1.575      50   0.753      40   0.569      30
PFC .456      20   0.329      10   0.244       5

$LOCAL
LQL    Q     100   50000
LTL   QS      20 5860000
LFLCLAY1     .50     .50
LFLSILT1    .075    .075
LFLSILT2    .075    .075
LFLSILT3    .075    .075
LFLSILT4    .075    .075
LFL  VFS    .050    .050
LFL   FS    .050    .050
LFL   MS    .040    .040
LFL   CS    .040    .040
LFL  VCS    .020    .020
LFL  VFG    .000    .000
LFL   FG    .000    .000
LFL   MG    .000    .000
LFL   CG    .000    .000
LFL  VCG    .000    .000
LFL   SC       0       0

$HYD
$SMOOTH       ON
$RATING 1
RC            40    4700   12000       0   806.3   807.0   807.6   808.0   808.3
RC         808.6   808.9   809.2   809.4   809.7   809.9   810.1   810.4   810.6
RC         810.8   811.0   811.1   811.3   811.5   811.7   811.9   812.0   812.2
RC         812.4   812.5   812.7   812.8   813.0   813.1   813.3   813.4   813.6
RC         813.7   813.8   814.0   814.1   814.2   814.3   814.5   814.6


*   AB  CONSTANT DISCHARGE DAY 1- 12/28/1923
Q  70000   27000
T     68      68
X      1     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 2- 2/17/1927
Q  51400    1400
T     68      68
X      2     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 3- 2/18/1927
Q  61000   11000
T     68      68
X      3     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 4- 2/19/1927
Q  39000   14000
T     68      68
X      4     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 5- 12/31/1965
Q  64100     100
T     68      68
X      5     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 6- 1/1/1966
Q  52600     600
T     68      68
X      6     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 7- 3/2/1978
Q  70100     100
T     68      68
X      7     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 8- 3/3/1978
Q  95500     500
T     68      68
X      8     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 9- 3/4/1978
Q  37500    1500
T     68      68
X      9     .05
$VOL
```

```
*   AB  CONSTANT DISCHARGE DAY 10- 12/19/1978
Q 110100     100
T     68      68
X     10     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 11- 12/20/1978
Q  88400     400
T     68      68
X     11     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 12- 12/21/1978
Q  63000    4000
T     68      68
X     12     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 13- 12/22/1978
Q  45000   10000
T     68      68
X     13     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 14- 12/23/1978
Q  37000    6000
T     68      68
X     14     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 15- 1/17/1979
Q  36600     600
T     68      68
X     15     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 16- 1/18/1979
Q  87800     800
T     68      68
X     16     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 17- 1/19/1979
Q  71400    1400
T     68      68
X     17     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 18- 1/20/1979
Q  60900    3900
T     68      68
X     18     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 19- 1/21/1979
Q  35000    8000
T     68      68
X     19     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 20- 3/29/1979
Q  52200     200
T     68      68
X     20     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 21- 3/30/1979
Q  40600     600
T     68      68
X     21     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 22- 3/31/1979
Q  46700     700
T     68      68
X     22     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 23- 2/16/1980
Q 140100     100
T     68      68
X     23     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 24- 2/17/1980
Q  99100     100
T     68      68
X     24     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 25- 2/18/1980
Q  85300     300
T     68      68
X     25     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 26- 2/19/1980
Q  91500     500
T     68      68
X     26     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 27- 2/20/1980
Q  97500     500
T     68      68
X     27     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 28- 2/21/1980
Q  94500     500
T     68      68
X     28     .05
$VOL
```

```
*   AB  CONSTANT DISCHARGE DAY 29- 2/22/1980
Q 117500     500
T     68      68
X     29     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 30- 2/23/1980
Q  84500     500
T     68      68
X     30     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 31- 2/24/1980
Q  60100     100
T     68      68
X     31     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 32- 2/25/1980
Q  64100     100
T     68      68
X     32     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 33- 2/26/1980
Q  35100     100
T     68      68
X     33     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 34- 10/2/1983
Q  41000    2000
T     68      68
X     34     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 35- 10/3/1983
Q  42000    2000
T     68      68
X     35     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 36- 10/4/1983
Q  82000   46000
T     68      68
X     36     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 37- 10/5/1983
Q  63000   36000
T     68      68
X     37     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 38- 10/6/1983
Q  37000   22000
T     68      68
X     38     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 39- 1/9/1993
Q 132100     100
T     68      68
X     39     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 40- 1/10/1993
Q  60800     800
T     68      68
X     40     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 41- 1/11/1993
Q  89000   11000
T     68      68
X     41     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 42- 1/12/1993
Q  74000    8000
T     68      68
X     42     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 43- 1/13/1993
Q  62000   19000
T     68      68
X     43     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 44- 1/14/1993
Q  83000   10000
T     68      68
X     44     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 45- 1/15/1993
Q  79000   13000
T     68      68
X     45     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 46- 1/16/1993
Q  89000   19000
T     68      68
X     46     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 47- 1/17/1993
Q  74000   15000
T     68      68
X     47     .05
$VOL
```

```
*   AB  CONSTANT DISCHARGE DAY 48- 1/18/1993
Q  92000   12000
T     68      68
X     48     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 49- 1/19/1993
Q 103000   12000
T     68      68
X     49     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 50- 1/20/1993
Q  74000   25000
T     68      68
X     50     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 51- 1/21/1993
Q  93000   43000
T     68      68
X     51     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 52- 1/22/1993
Q  94000   42000
T     68      68
X     52     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 53- 1/23/1993
Q  76000   28000
T     68      68
X     53     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 54- 1/24/1993
Q  62000   20000
T     68      68
X     54     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 55- 1/25/1993
Q  52000   15000
T     68      68
X     55     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 56- 2/21/1993
Q  72000    6000
T     68      68
X     56     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 57- 2/22/1993
Q  54000    7000
T     68      68
X     57     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 58- 2/23/1993
Q  50000    8000
T     68      68
X     58     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 59- 2/24/1993
Q  50000    8000
T     68      68
X     59     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 60- 2/25/1993
Q  57000    9000
T     68      68
X     60     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 61- 2/26/1993
Q  44000    9000
T     68      68
X     61     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 62- 2/27/1993
Q  35000    8000
T     68      68
X     62     .05
$VOL
*   AB  CONSTANT DISCHARGE DAY 63- 2/16/1995
Q  51100     100
T     68      68
X     63     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 1
Q  40000    9000
T     68      68
X     64     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 2
Q 200000   46000
T     68      68
X     65     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 3
Q 165000   38000
T     68      68
X     66     .05
$VOL
```

```
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 4
Q 140000   32000
T     68      68
X     67     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 5
Q 120000   28000
T     68      68
X     68     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 6
Q 103000   24000
T     68      68
X     69     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 7
Q  90000   21000
T     68      68
X     70     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 8
Q  79000   18000
T     68      68
X     71     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 9
Q  68000   16000
T     68      68
X     72     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 10
Q  58000   13000
T     68      68
X     73     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 11
Q  49000   11000
T     68      68
X     74     .05
$VOL
*   AB  CONSTANT DISCHARGE, SYNTHESIZED 100-YEAR HDYROGRAPH - DAY 12
Q  40000    9000
T     68      68
X     75     .05

$VOL  A
$$END
```

Attachment 4:

Output of the Base HEC-6T Model

```
1
08:25:41.99     09/21/05
************************************************************
*          SEDIMENTATION IN STREAM NETWORKS (HEC-6T)       *
*                          BY                              *
*                    William A. Thomas                     *
*                                                          *
*                                                          *
*                                                          *
* VERSION 5.13.20                        February 05, 2003 *
* A MODIFICATION OF                                        *
* VERSION 4.00.00                         January 01, 1994 *
*                                                          *
* COPYRIGHT (c) 2002,  MBH SOFTWARE, INC.                  *
* P.O.BOX 264                        TELEPHONE 601-925-4092 *
* CLINTON, MISSISSIPPI 39060               FAX 601-925-4093 *
* e-mail mbh2o@aol.com                                     *
************************************************************


************************************************************
* Disclaimer:                                              *
* This computer program was written for use by engineers   *
* and scientist who are competent in the field of Sedimen- *
* tation Engineering.  It provides a framework for perform- *
* ing Sedimentation Computations.                          *
*                                                          *
*                                                          *
* This Program and Documentation are provided "AS IS," with-*
* out warranty of any kind, either express or implied.  All *
* warranties of any type respecting this program and/or the *
* documentation are hereby disclaimed by the author.       *
*                                                          *
*                                       William A. Thomas *
************************************************************

THIS PROGRAM IS DIMENSIONED FOR:
MAXIMUM NUMBER OF CROSS SECTIONS                    =  1200
MAXIMUM NUMBER OF CONTROL POINTS                    =    51
MAXIMUM NUMBER OF SEGMENTS                          =    50
MAXIMUM NUMBER OF SEGMENTS JOINING A CONTROL POINT=      3
MAXIMUM NUMBER OF LOCAL INFLOW POINTS PER SEGMENT =    50
MAXIMUM NUMBER OF CROSS SECTION (STA,ELEV) POINTS =   600
MAXIMUM NUMBER OF DREDGING SITES                    =   500
MAXIMUM NUMBER OF GRAIN SIZES                       =    20


TABLE GEO-1.  GEOMETRIC MODEL FOR SEGMENT   1
T1    El Rio Watercourse Master Plan 82000240
T2    Prepared for Flood Control District of Maricopa County
T3    Stantec Consulting Inc., Aug 2005

SEGMENT NUMBER =    1

       File Name: base.T5
       Existing Conditions- Full model hydrology
       63 days of streamflow selected from 1920-2004 historic records
       12 days of streamflow taken from the synthetic 100 year hydrograph
       Hydrology input seperately for the Salt and Gila Rivers at thier confluen
       Salt River is modeled as the main stem
       The Gila River upstream of the confluence is modeled as a local inflow at
       Geometry from Micheal Baker Jr Inc, 1999. Floodplain Delineation Study
       and West Existing Conditions model for King Ranch and Cotton Lane
       Model limits from RM 178.61 to RM 199.07
       West model limits from RM 186.87 to RM 195.75
       Topography for Baker and portions of West model from 1992/93
       New topography (2004) used in West model from RM 189.02 to RM 194.21
       Bank Stations are set at lateral limits of 1993 flood
       Bed Material from RM 190.05 to 199.07 represents coarser (sand and gravel
       size material entering from the Salt River
       Bed Material from RM 178.61 to 187.24 is finer (sand)
       size material that comprises the majority of the Gila River
       Seperate sediment inflow rating curves are used for the Salt and Gila Riv
       Inflowing sediment rating curves developed from analysis and interpretati
       of USGS data collected near Gillespie Dam
       Inflowing percent sediment was determined by George Sabol- Aug, 2005
       Salt River-includes clay, 4 silt sizes, 5 sand sizes and 1 gravel size
       10% of the total inflowing sediment load is coarser than 0.062mm (sand an
       Gila River-includes clay, 4 silt sizes and 5 sand sizes
       20% of the total inflowing sediment load is coarser than 0.062mm (sand)
       Cross sections coded left to right facing downstream.
       Channel Manning's roughness set to 0.03
       Overbank roughness is conveyance weighted overbank 'n' from Baker model
       Sediment transport is by Yang's Stream Power Function


SECTION NO.    1 RIVER MILE=    178.610


SECTION NO.    2 RIVER MILE=    178.680
```

```
SECTION NO.    3 RIVER MILE=    178.770

SECTION NO.    4 RIVER MILE=    178.860

SECTION NO.    5 RIVER MILE=    178.950

SECTION NO.    6 RIVER MILE=    179.030

SECTION NO.    7 RIVER MILE=    179.110

SECTION NO.    8 RIVER MILE=    179.200

SECTION NO.    9 RIVER MILE=    179.250

SECTION NO.   10 RIVER MILE=    179.300

SECTION NO.   11 RIVER MILE=    179.350

SECTION NO.   12 RIVER MILE=    179.400

SECTION NO.   13 RIVER MILE=    179.500

SECTION NO.   14 RIVER MILE=    179.590

SECTION NO.   15 RIVER MILE=    179.680

SECTION NO.   16 RIVER MILE=    179.760

SECTION NO.   17 RIVER MILE=    179.840

SECTION NO.   18 RIVER MILE=    179.910

SECTION NO.   19 RIVER MILE=    180.040

SECTION NO.   20 RIVER MILE=    180.060

SECTION NO.   21 RIVER MILE=    180.090

SECTION NO.   22 RIVER MILE=    180.180

SECTION NO.   23 RIVER MILE=    180.280

SECTION NO.   24 RIVER MILE=    180.370

SECTION NO.   25 RIVER MILE=    180.470
```

SECTION NO. 26 RIVER MILE= 180.560

SECTION NO. 27 RIVER MILE= 180.650

SECTION NO. 28 RIVER MILE= 180.750

SECTION NO. 29 RIVER MILE= 180.850

SECTION NO. 30 RIVER MILE= 180.940

SECTION NO. 31 RIVER MILE= 180.990

SECTION NO. 32 RIVER MILE= 181.040

SECTION NO. 33 RIVER MILE= 181.130

SECTION NO. 34 RIVER MILE= 181.230

SECTION NO. 35 RIVER MILE= 181.320

SECTION NO. 36 RIVER MILE= 181.410

SECTION NO. 37 RIVER MILE= 181.510

SECTION NO. 38 RIVER MILE= 181.620

SECTION NO. 39 RIVER MILE= 181.740

SECTION NO. 40 RIVER MILE= 181.820

SECTION NO. 41 RIVER MILE= 181.900

SECTION NO. 42 RIVER MILE= 181.990

SECTION NO. 43 RIVER MILE= 182.080

SECTION NO. 44 RIVER MILE= 182.170

SECTION NO. 45 RIVER MILE= 182.270

SECTION NO. 46 RIVER MILE= 182.360

SECTION NO. 47 RIVER MILE= 182.450

SECTION NO. 48 RIVER MILE= 182.550

SECTION NO. 49 RIVER MILE= 182.640

SECTION NO. 50 RIVER MILE= 182.740

SECTION NO. 51 RIVER MILE= 182.830

SECTION NO. 52 RIVER MILE= 182.920

SECTION NO. 53 RIVER MILE= 183.020

SECTION NO. 54 RIVER MILE= 183.110

SECTION NO. 55 RIVER MILE= 183.200

SECTION NO. 56 RIVER MILE= 183.300

SECTION NO. 57 RIVER MILE= 183.390

SECTION NO. 58 RIVER MILE= 183.490

SECTION NO. 59 RIVER MILE= 183.580

SECTION NO. 60 RIVER MILE= 183.670

SECTION NO. 61 RIVER MILE= 183.770

SECTION NO. 62 RIVER MILE= 183.860

SECTION NO. 63 RIVER MILE= 183.960

SECTION NO. 64 RIVER MILE= 184.050

SECTION NO. 65 RIVER MILE= 184.140

SECTION NO. 66 RIVER MILE= 184.240

SECTION NO. 67 RIVER MILE= 184.330

SECTION NO. 68 RIVER MILE= 184.430

SECTION NO. 69 RIVER MILE= 184.530

SECTION NO. 70 RIVER MILE= 184.620

SECTION NO. 71 RIVER MILE= 184.710

SECTION NO. 72 RIVER MILE= 184.810

SECTION NO. 73 RIVER MILE= 184.900

SECTION NO. 74 RIVER MILE= 185.000

SECTION NO. 75 RIVER MILE= 185.100

SECTION NO. 76 RIVER MILE= 185.190

SECTION NO. 77 RIVER MILE= 185.280

SECTION NO. 78 RIVER MILE= 185.380

SECTION NO. 79 RIVER MILE= 185.460

SECTION NO. 80 RIVER MILE= 185.530

SECTION NO. 81 RIVER MILE= 185.610

SECTION NO. 82 RIVER MILE= 185.710

SECTION NO. 83 RIVER MILE= 185.810

SECTION NO. 84 RIVER MILE= 185.900

SECTION NO. 85 RIVER MILE= 186.000

SECTION NO. 86 RIVER MILE= 186.100

SECTION NO. 87 RIVER MILE= 186.190

SECTION NO. 88 RIVER MILE= 186.270

SECTION NO. 89 RIVER MILE= 186.360

SECTION NO. 90 RIVER MILE= 186.460

SECTION NO. 91 RIVER MILE= 186.550

SECTION NO. 92 RIVER MILE= 186.610

SECTION NO. 93 RIVER MILE= 186.690

SECTION NO. 94 RIVER MILE= 186.780

SECTION NO. 95 RIVER MILE= 186.870

SECTION NO. 96 RIVER MILE= 186.970

SECTION NO. 97 RIVER MILE= 187.060

SECTION NO. 98 RIVER MILE= 187.150

SECTION NO. 99 RIVER MILE= 187.240

SECTION NO. 100 RIVER MILE= 187.360

SECTION NO. 101 RIVER MILE= 187.450

SECTION NO. 102 RIVER MILE= 187.540

SECTION NO. 103 RIVER MILE= 187.640

SECTION NO. 104 RIVER MILE= 187.730

SECTION NO. 105 RIVER MILE= 187.820

SECTION NO. 106 RIVER MILE= 187.910

SECTION NO. 107 RIVER MILE= 188.000

SECTION NO. 108 RIVER MILE= 188.070

SECTION NO. 109 RIVER MILE= 188.100

SECTION NO. 110 RIVER MILE= 188.200

SECTION NO. 111 RIVER MILE= 188.290

SECTION NO. 112 RIVER MILE= 188.390

SECTION NO. 113 RIVER MILE= 188.500

SECTION NO. 114 RIVER MILE= 188.590

SECTION NO. 115 RIVER MILE= 188.700

SECTION NO. 116 RIVER MILE= 188.810

SECTION NO. 117 RIVER MILE= 188.920

SECTION NO. 118 RIVER MILE= 189.020

SECTION NO. 119 RIVER MILE= 189.120

SECTION NO. 120 RIVER MILE= 189.220

SECTION NO. 121 RIVER MILE= 189.310

SECTION NO. 122 RIVER MILE= 189.390

SECTION NO. 123 RIVER MILE= 189.490

SECTION NO. 124 RIVER MILE= 189.580

SECTION NO. 125 RIVER MILE= 189.680

SECTION NO. 126 RIVER MILE= 189.770

SECTION NO. 127 RIVER MILE= 189.870

SECTION NO. 128 RIVER MILE= 189.960

SECTION NO. 129 RIVER MILE= 190.050

SECTION NO. 130 RIVER MILE= 190.150

SECTION NO. 131 RIVER MILE= 190.240

SECTION NO. 132 RIVER MILE= 190.340

SECTION NO. 133 RIVER MILE= 190.430

SECTION NO. 134 RIVER MILE= 190.530

SECTION NO. 135 RIVER MILE= 190.620

SECTION NO. 136 RIVER MILE= 190.710

SECTION NO. 137 RIVER MILE= 190.800

SECTION NO. 138 RIVER MILE= 190.890

SECTION NO. 139 RIVER MILE= 190.990

SECTION NO. 140 RIVER MILE= 191.080

SECTION NO. 141 RIVER MILE= 191.170

SECTION NO. 142 RIVER MILE= 191.270

SECTION NO. 143 RIVER MILE= 191.360

SECTION NO. 144 RIVER MILE= 191.460

SECTION NO. 145 RIVER MILE= 191.550

SECTION NO. 146 RIVER MILE= 191.650

SECTION NO. 147 RIVER MILE= 191.750

SECTION NO. 148 RIVER MILE= 191.840

SECTION NO. 149 RIVER MILE= 191.940

SECTION NO. 150 RIVER MILE= 192.040

SECTION NO. 151 RIVER MILE= 192.130

SECTION NO. 152 RIVER MILE= 192.230

SECTION NO. 153 RIVER MILE= 192.330

SECTION NO. 154 RIVER MILE= 192.420

SECTION NO. 155 RIVER MILE= 192.510

SECTION NO. 156 RIVER MILE= 192.600

SECTION NO. 157 RIVER MILE= 192.690

SECTION NO. 158 RIVER MILE= 192.780

SECTION NO. 159 RIVER MILE= 192.880

SECTION NO. 160 RIVER MILE= 192.970

SECTION NO. 161 RIVER MILE= 193.070

SECTION NO. 162 RIVER MILE= 193.160

SECTION NO. 163 RIVER MILE= 193.240

SECTION NO. 164 RIVER MILE= 193.360

SECTION NO. 165 RIVER MILE= 193.450

SECTION NO. 166 RIVER MILE= 193.540

SECTION NO. 167 RIVER MILE= 193.650

SECTION NO. 168 RIVER MILE= 193.710

SECTION NO. 169 RIVER MILE= 193.780

SECTION NO. 170 RIVER MILE= 193.860

SECTION NO. 171 RIVER MILE= 193.930

SECTION NO. 172 RIVER MILE= 194.010

SECTION NO. 173 RIVER MILE= 194.090

SECTION NO. 174 RIVER MILE= 194.210

SECTION NO. 175 RIVER MILE= 194.290

SECTION NO. 176 RIVER MILE= 194.400

SECTION NO. 177 RIVER MILE= 194.530

SECTION NO. 178 RIVER MILE= 194.620

SECTION NO. 179 RIVER MILE= 194.720

SECTION NO. 180 RIVER MILE= 194.810

SECTION NO. 181 RIVER MILE= 194.910

SECTION NO. 182 RIVER MILE= 195.000

SECTION NO. 183 RIVER MILE= 195.090

SECTION NO. 184 RIVER MILE= 195.160

SECTION NO. 185 RIVER MILE= 195.190

SECTION NO. 186 RIVER MILE= 195.280

SECTION NO. 187 RIVER MILE= 195.380

SECTION NO. 188 RIVER MILE= 195.470

SECTION NO. 189 RIVER MILE= 195.560

SECTION NO. 190 RIVER MILE= 195.660

SECTION NO. 191 RIVER MILE= 195.750

SECTION NO. 192 RIVER MILE= 195.850

SECTION NO. 193 RIVER MILE= 195.940

SECTION NO. 194 RIVER MILE= 196.040

SECTION NO. 195 RIVER MILE= 196.130

SECTION NO. 196 RIVER MILE= 196.230

SECTION NO. 197 RIVER MILE= 196.320

SECTION NO. 198 RIVER MILE= 196.420

SECTION NO. 199 RIVER MILE= 196.510

SECTION NO. 200 RIVER MILE= 196.610

SECTION NO. 201 RIVER MILE= 196.700

SECTION NO. 202 RIVER MILE= 196.790

SECTION NO. 203 RIVER MILE= 196.880

SECTION NO. 204 RIVER MILE= 196.980

SECTION NO. 205 RIVER MILE= 197.070

SECTION NO. 206 RIVER MILE= 197.160

SECTION NO. 207 RIVER MILE= 197.260

SECTION NO: 208 RIVER MILE= 197.350

SECTION NO. 209 RIVER MILE= 197.450

SECTION NO. 210 RIVER MILE= 197.540

SECTION NO. 211 RIVER MILE= 197.640

SECTION NO. 212 RIVER MILE= 197.740

SECTION NO. 213 RIVER MILE= 197.830

SECTION NO. 214 RIVER MILE= 197.920

SECTION NO. 215 RIVER MILE= 198.020

SECTION NO. 216 RIVER MILE= 198.110

SECTION NO. 217 RIVER MILE= 198.200

SECTION NO. 218 RIVER MILE= 198.260

SECTION NO. 219 RIVER MILE= 198.300

SECTION NO. 220 RIVER MILE= 198.340

SECTION NO. 221 RIVER MILE= 198.400

SECTION NO. 222 RIVER MILE= 198.490

SECTION NO. 223 RIVER MILE= 198.590

SECTION NO. 224 RIVER MILE= 198.650

SECTION NO. 225 RIVER MILE= 198.730

SECTION NO. 226 RIVER MILE= 198.790

SECTION NO. 227 RIVER MILE= 198.860

SECTION NO. 228 RIVER MILE= 198.960

SEGMENT NO 1 LOCAL INFLOW POINT 1 OCCURS DOWNSTREAM FROM X-SECTION NO. 229
Q IS PRESCRIBED

SECTION NO. 229 RIVER MILE= 199.070

NUMBER OF CROSS SECTIONS IN SEGMENT = 229
ACCUMULATED NO. OF X-SECTIONS IN MODEL = 229

END OF GEOMETRIC DATA

NO. OF INPUT DATA MESSAGES = 0

TABLE GEO-5. NETWORK STRUCTURE.

SEGMENT NO.	CONTROL POINTS DOWNSTREAM		CONTROL POINTS UPSTREAM		NUMBER OF LOCAL INFLOW POINTS				MAP QW & WT TO SEGMENT NO	
	NO.	TYPE	NO.	TYPE	QT	QP	QL	QF	Q FLD	SEG NO
1	1	1	2	3	1	0	0	0		
									1	1
									2	1

```
 TABLE SED-1.  SEDIMENTARY DATA
1
 T4  Yang's Stream Power Function
 T5  See notes at beginning of model
 T6  Inflowing sediment developed from USGS data
 T7  Bed Material developed from field samples
 T8  ********************************************************

 SEDIMENT PARAMETER DATA
I1  SPI  IBG  MNQ      SPGF      ACGR     NFALL    IBSHER
    25.    0    1     1.000    32.174         2         1


 CLAY IS PRESENT.
        MTCL      SPGC    PUCDLB    UWCLLB   CCCDLB
 I2      1      2.650    78.000    30.000    16.000

   DEPOSITION COEFFICIENTS BY LAYER
   DEPOSITION
    THRESHOLD
     SHEAR
     STRESS
    # / SQFT

  1 0.20000E-01
  2 0.20000E-01

   EROSION COEFFICIENTS BY LAYER
    PARTICLE        MASS       MASS      SLOPE     SLOPE
     EROSION      EROSION    EROSION  OF PARTICLE OF MASS
      SHEAR         SHEAR      RATE     EROSION   EROSION
     STRESS        STRESS              LINE=ER1  LINE=ER2
    # / SQFT      # / SQFT  /SQFT/HR      1/HR      1/HR

  1 0.10000E+21 0.10000E+21   0.0000    0.0000    0.0000
  2 0.10000E+21 0.10000E+21   0.0000    0.0000    0.0000

 SAND/GRAVEL EROSION IS LIMITED IF % CLAY >    10.00


 SILT IS PRESENT
        MTSL     IASL     LASL      SGSL       PUSDLB    UWSDLB    CCSDLB
 I3      1        1        4      2.650     82.000    65.000     5.700

   DEPOSITION COEFFICIENTS BY LAYER
   DEPOSITION
    THRESHOLD
     SHEAR
     STRESS
    # / SQFT

  1 0.20000E-01
  2 0.20000E-01

            SILT EROSION COEFFICIENTS BY LAYER
   ****************  SAME VALUES AS CLAY   **************


 SAND (AND LARGER) SIZES ARE PRESENT

        MTC      IASA     LASA      SPGS       GSF      BSAE       PSI     UWDLB
 I4      4        1       11      2.650     0.667     0.500    30.000    93.000


 TABLE SED-2.  FOLLOWING GRAIN SIZES UTILIZED
    CLASS INTERVAL     : MEDIAN :SHAPE: SP WT  : COVER   :  SP WT :CLASS: Y/D :
    --:------:--------:  DIA   : FAC.:INACTIVE: LAYER   :  ACTIVE:  #  :RATIO:
      :      :        :        :     : LAYER  : COEF.   :  LAYER :     :     :
   #  : (MM) :  (FT)  :  (FT)   :     : TON/CF :SQFT/TON :  TON/CF:     :     :

       0.0000  0.000007
   1 CLAY SIZE=        0.000009   0.6  0.0390 0.138159E+07  0.0150   1    1.00
       0.0040  0.000013
   2 SILT SIZE=        0.000019  0.60  0.0410  657100.      0.0325   2   1.000
       0.0080  0.000026
   3 SILT SIZE=        0.000037  0.60  0.0410  328550.      0.0325   2   1.000
       0.0160  0.000052
   4 SILT SIZE=        0.000074  0.60  0.0410  164275.      0.0325   2   1.000
       0.0320  0.000105
   5 SILT SIZE=        0.000147  0.60  0.0410  83117.3      0.0325   2   1.000
       0.0625  0.000205
   6 SAND SIZE=        0.000290   0.7  0.0465  37080.2      0.0465   3    1.00
       0.1250  0.000410
   7 SAND SIZE=        0.000580   0.7  0.0465  18540.1      0.0465   3    1.00
       0.2500  0.000820
   8 SAND SIZE=        0.001160   0.7  0.0465  9270.05      0.0465   3    0.40
       0.5000  0.001640
   9 SAND SIZE=        0.002320   0.7  0.0465  4635.03      0.0465   3    0.09
       1.0000  0.003281
  10 SAND SIZE=        0.004640   0.7  0.0465  2317.51      0.0465   3    0.09
       2.0000  0.006562
  11 GRAVEL   =        0.009280   0.7  0.0465  1158.76      0.0465   3    0.09
            4.  0.013123
```

```
 12 GRAVEL   =        0.018559   0.7  0.0465  579.378        0.0465   3    0.09
          8.  0.026246
 13 GRAVEL   =        0.037118   0.7  0.0465  289.689        0.0465   3    0.09
         16.  0.052493
 14 GRAVEL   =        0.074236   0.7  0.0465  144.845        0.0465   3    0.09
         32.  0.104986
 15 GRAVEL   =        0.148472   0.7  0.0465  72.4223        0.0465   3    0.09
         64.  0.209971
 16 COBB/BOUL=        0.296944   0.7  0.0465  36.2112        0.0465   3    0.09
        128.  0.419942

COEFFICIENTS FOR COMPUTATION SCHEME WERE SPECIFIED
      DBI       DBN       XID       XIN       XIU       UBI       UBN       JSL
   0.0000    1.0000    0.0000    1.0000    0.0000    0.0000    1.0000         2


TRANSPORT FUNCTION IS -- YANG                    MTC =  4


TABLE SED-3.  Q-QS RATING TABLE
THIS SEDIMENT DISCHARGE TABLE CONTAINS   2 WATER DISCHARGES.
     IT IS FOR SEGMENT NUMBER            1
     AT CONTROL POINT NO.                2
LOAD BY GRAIN SIZE CLASS, TONS/DAY

LQ      Q* 1500.00     * 160000.     *
LF CLAY1* 810.000     *0.141000E+08*
LF SILT1* 101.250     *0.176250E+07*
LF SILT2* 101.250     *0.176250E+07*
LF SILT3* 101.250     *0.176250E+07*
LF SILT4* 101.250     *0.176250E+07*
LF   VFS* 27.0000     * 470000.     *
LF    FS* 27.0000     * 470000.     *
LF    MS* 27.0000     * 470000.     *
LF    CS* 27.0000     * 470000.     *
LF   VCS* 13.5000     * 235000.     *
LF   VFG* 13.5000     * 235000.     *
LF    FG*0.100000E-19*0.100000E-19*
LF    MG*0.100000E-19*0.100000E-19*
LF    CG*0.100000E-19*0.100000E-19*
LF   VCG*0.100000E-19*0.100000E-19*
LF    SC*0.100000E-19*0.100000E-19*
          ----------   ----------
    SUM=* 1350.00     *0.235000E+08*


TABLE SED-4.  CROSS SECTION LOCATIONS
  SEC NO.     REACH     INITIAL BED ELEVATIONS      ACCUMULATED CNANNEL DISTANCE
              LENGTH LEFT SIDE  THALWEG  RIGHT SIDE      FROM DOWNSTREAM
                                                          FEET       MILES

              378.34
   178.610              824.30    802.20    824.50         0.0       0.000
              378.34
   178.680              824.30    803.40    827.80       378.3       0.072
              444.41
   178.770              827.30    804.10    825.40       822.8       0.156
              477.98
   178.860              827.50    805.10    826.50      1300.7       0.246
              470.20
   178.950              825.60    804.80    823.90      1770.9       0.335
              416.83
   179.030              825.50    803.90    825.20      2187.8       0.414
              425.80
   179.110              827.50    806.10    827.20      2613.6       0.495
              497.05
   179.200              829.70    806.30    828.00      3110.6       0.589
              259.41
   179.250              831.10    807.30    832.70      3370.0       0.638
              258.47
   179.300              832.80    808.30    831.40      3628.5       0.687
              261.22
   179.350              832.30    808.20    831.10      3889.7       0.737
              262.49
   179.400              829.60    808.30    830.10      4152.2       0.786
              506.43
   179.500              832.40    810.10    833.50      4658.6       0.882
              504.22
   179.590              835.10    811.10    833.70      5162.9       0.978
              494.98
   179.680              841.10    810.90    841.30      5657.8       1.072
              401.33
   179.760              830.70    809.80    836.40      6059.2       1.148
              399.92
   179.840              842.50    812.40    843.50      6459.1       1.223
              409.73
   179.910              835.10    812.90    835.60      6868.8       1.301
              605.10
   180.040              832.00    811.12    834.00      7473.9       1.416
              157.22
   180.060              827.70    814.40    837.10      7631.1       1.445
              156.48
   180.090              828.70    814.60    840.70      7787.6       1.475
```

	495.76					
180.180		830.70	817.10	836.60	8283.4	1.569
	507.80					
180.280		833.50	817.60	840.40	8791.2	1.665
	510.23					
180.370		836.90	818.40	835.50	9301.4	1.762
	498.37					
180.470		839.00	819.80	844.50	9799.8	1.856
	492.85					
180.560		839.00	820.50	840.70	10292.6	1.949
	483.21					
180.650		840.70	820.90	841.60	10775.8	2.041
	508.13					
180.750		840.00	821.40	842.00	11284.0	2.137
	524.58					
180.850		843.40	821.80	842.60	11808.5	2.236
	479.73					
180.940		840.00	821.60	841.50	12288.3	2.327
	272.51					
180.990		845.90	820.70	846.10	12560.8	2.379
	229.74					
181.040		837.80	820.60	843.40	12790.5	2.422
	496.11					
181.130		848.60	821.80	847.00	13286.6	2.516
	513.06					
181.230		848.80	822.60	846.20	13799.7	2.614
	493.37					
181.320		844.80	822.80	846.50	14293.1	2.707
	497.47					
181.410		844.00	823.40	846.10	14790.5	2.801
	521.13					
181.510		841.00	824.10	842.90	15311.7	2.900
	551.52					
181.620		842.40	824.10	846.70	15863.2	3.004
	625.63					
181.740		849.00	824.70	848.90	16488.8	3.123
	463.36					
181.820		845.90	824.90	848.80	16952.2	3.211
	414.11					
181.900		845.60	826.20	848.50	17366.3	3.289
	443.58					
181.990		842.30	826.20	848.30	17809.9	3.373
	509.10					
182.080		848.40	826.30	846.60	18319.0	3.469
	471.44					
182.170		847.80	826.40	851.80	18790.4	3.559
	496.27					
182.270		850.10	827.10	850.40	19286.7	3.653
	493.32					
182.360		853.10	823.80	850.40	19780.0	3.746
	493.26					
182.450		850.20	824.50	849.10	20273.2	3.840
	507.96					
182.550		850.10	827.30	849.20	20781.2	3.936
	498.71					
182.640		850.00	827.50	851.70	21279.9	4.030
	492.12					
182.740		858.20	827.70	856.90	21772.0	4.123
	491.48					
182.830		849.80	828.80	848.30	22263.5	4.217
	496.47					
182.920		853.20	829.00	851.30	22760.0	4.311
	494.50					
183.020		853.80	829.30	851.50	23254.5	4.404
	494.40					
183.110		854.70	829.20	854.50	23748.9	4.498
	495.51					
183.200		852.40	829.70	853.20	24244.4	4.592
	499.99					
183.300		852.50	829.90	853.00	24744.4	4.686
	492.34					
183.390		856.80	831.50	854.70	25236.7	4.780
	506.57					
183.490		854.90	831.50	855.00	25743.3	4.876
	493.31					
183.580		856.60	833.00	858.80	26236.6	4.969
	489.05					
183.670		859.70	834.40	855.20	26725.7	5.062
	511.32					
183.770		859.40	834.80	857.10	27237.0	5.159
	485.05					
183.860		859.30	835.40	859.10	27722.0	5.250
	485.76					
183.960		857.20	835.90	857.30	28207.8	5.342
	504.20					
184.050		857.90	836.20	856.60	28712.0	5.438
	493.72					
184.140		861.70	836.20	859.50	29205.7	5.531
	504.24					
184.240		860.30	836.80	860.20	29710.0	5.627
	499.71					
184.330		861.10	837.10	857.70	30209.7	5.722
	505.74					
184.430		860.30	837.30	862.80	30715.4	5.817
	508.72					

184.530		865.20	837.90	863.20	31224.1	5.914
	508.57					
184.620		858.30	838.20	860.90	31732.7	6.010
	480.91					
184.710		865.20	838.80	863.10	32213.6	6.101
	505.87					
184.810		872.40	839.60	872.20	32719.5	6.197
	473.98					
184.900		865.20	839.80	864.10	33193.5	6.287
	516.75					
185.000		858.10	841.70	863.60	33710.2	6.385
	544.41					
185.100		864.70	842.40	864.30	34254.6	6.488
	477.45					
185.190		864.50	842.90	865.50	34732.1	6.578
	481.96					
185.280		862.60	841.50	864.50	35214.0	6.669
	498.20					
185.380		868.10	843.10	865.20	35712.2	6.764
	446.49					
185.460		871.00	844.20	865.00	36158.7	6.848
	385.26					
185.530		871.10	845.00	864.60	36544.0	6.921
	410.24					
185.610		874.60	844.90	864.50	36954.2	6.999
	521.31					
185.710		872.50	846.10	872.20	37475.5	7.098
	506.15					
185.810		870.80	843.60	869.50	37981.7	7.193
	521.25					
185.900		873.10	846.30	872.90	38502.9	7.292
	507.87					
186.000		871.70	845.80	870.50	39010.8	7.388
	506.66					
186.100		871.50	848.80	870.70	39517.4	7.484
	513.30					
186.190		869.70	848.90	869.70	40030.8	7.582
	425.61					
186.270		860.10	849.80	869.20	40456.4	7.662
	470.98					
186.360		866.70	850.20	873.40	40927.3	7.751
	494.75					
186.460		872.50	850.90	870.40	41422.1	7.845
	489.65					
186.550		868.50	850.00	872.20	41911.7	7.938
	290.56					
186.610		872.50	849.60	872.00	42202.3	7.993
	455.31					
186.690		877.10	850.50	873.70	42657.6	8.079
	460.85					
186.780		883.70	851.70	873.90	43118.5	8.166
	494.14					
186.870		876.50	852.60	874.20	43612.6	8.260
	487.74					
186.970		876.10	851.90	874.30	44100.3	8.352
	491.11					
187.060		871.40	851.90	874.90	44591.4	8.445
	501.33					
187.150		878.90	853.20	874.20	45092.8	8.540
	481.03					
187.240		876.90	853.80	874.00	45573.8	8.631
	610.00					
187.360		877.90	853.70	878.50	46183.8	8.747
	500.61					
187.450		879.40	855.30	879.20	46684.4	8.842
	444.68					
187.540		877.90	855.90	877.30	47129.1	8.926
	513.43					
187.640		878.60	856.10	877.80	47642.5	9.023
	474.38					
187.730		880.20	855.40	878.60	48116.9	9.113
	490.95					
187.820		880.00	855.40	879.90	48607.9	9.206
	456.46					
187.910		880.80	856.50	881.50	49064.3	9.292
	526.41					
188.000		882.70	858.30	881.90	49590.7	9.392
	289.92					
188.070		884.00	855.00	879.30	49880.6	9.447
	193.81					
188.100		882.40	855.80	881.20	50074.5	9.484
	525.06					
188.200		884.10	859.30	882.40	50599.5	9.583
	492.53					
188.290		885.40	859.60	882.80	51092.0	9.677
	536.34					
188.390		888.30	860.70	884.40	51628.4	9.778
	581.55					
188.500		891.20	860.50	882.90	52209.9	9.888
	493.58					
188.590		881.20	861.40	882.50	52703.5	9.982
	542.71					
188.700		893.10	863.30	882.60	53246.2	10.085
	612.89					
188.810		891.50	863.50	883.60	53859.1	10.201

	550.91					
188.920		888.10	863.30	882.60	54410.0	10.305
	1007.71					
189.020		885.30	855.20	883.07	55417.7	10.496
	502.70					
189.120		896.10	857.40	884.09	55920.4	10.591
	507.79					
189.220		897.00	857.00	884.40	56428.2	10.687
	480.84					
189.310		893.40	856.36	885.57	56909.1	10.778
	440.54					
189.390		888.80	855.00	885.68	57349.6	10.862
	507.88					
189.490		894.00	857.80	884.00	57857.5	10.958
	497.05					
189.580		897.80	857.92	884.00	58354.5	11.052
	503.46					
189.680		895.80	862.77	884.00	58858.0	11.147
	523.29					
189.770		889.40	860.75	888.00	59381.3	11.246
	541.41					
189.870		893.50	862.94	892.00	59922.7	11.349
	497.50					
189.960		890.40	857.56	892.00	60420.2	11.443
	485.07					
190.050		897.00	858.06	892.00	60905.3	11.535
	514.92					
190.150		895.80	865.74	892.00	61420.2	11.633
	495.80					
190.240		903.10	866.29	892.00	61916.0	11.727
	509.87					
190.340		902.30	866.60	892.41	62425.9	11.823
	506.58					
190.430		909.80	867.33	895.70	62932.4	11.919
	491.68					
190.530		917.90	866.16	892.71	63424.1	12.012
	514.35					
190.620		902.80	867.26	889.50	63938.5	12.110
	494.64					
190.710		916.80	866.74	892.11	64433.1	12.203
	482.83					
190.800		895.20	867.87	892.00	64915.9	12.295
	486.04					
190.890		909.20	868.14	893.80	65402.0	12.387
	516.20					
190.990		908.00	870.25	892.00	65918.2	12.485
	486.51					
191.080		894.70	870.81	896.00	66404.7	12.577
	500.81					
191.170		899.70	869.63	895.59	66905.5	12.671
	496.53					
191.270		914.70	870.35	895.62	67402.0	12.766
	493.83					
191.360		907.60	871.59	895.10	67895.9	12.859
	513.79					
191.460		914.00	870.92	896.00	68409.6	12.956
	484.36					
191.550		913.70	870.74	896.11	68894.0	13.048
	472.49					
191.650		909.10	873.19	896.00	69366.5	13.138
	535.80					
191.750		908.80	874.90	899.98	69902.3	13.239
	494.94					
191.840		903.40	874.08	900.24	70397.2	13.333
	516.85					
191.940		913.20	874.95	901.00	70914.1	13.431
	513.01					
192.040		917.40	876.49	902.10	71427.1	13.528
	481.87					
192.130		918.60	876.10	905.50	71909.0	13.619
	516.34					
192.230		902.20	876.97	909.49	72425.3	13.717
	509.68					
192.330		934.90	876.05	910.91	72935.0	13.813
	512.02					
192.420		915.60	876.59	908.00	73447.0	13.910
	483.94					
192.510		917.10	878.19	909.80	73930.9	14.002
	487.85					
192.600		901.50	878.36	908.83	74418.8	14.094
	510.58					
192.690		917.70	876.75	908.42	74929.4	14.191
	506.70					
192.780		965.20	876.99	909.37	75436.1	14.287
	542.33					
192.880		927.30	879.61	907.98	75978.4	14.390
	490.99					
192.970		940.40	881.10	907.52	76469.4	14.483
	550.85					
193.070		911.20	881.69	908.00	77020.2	14.587
	493.54					
193.160		916.10	880.68	908.00	77513.8	14.681
	432.24					
193.240		936.20	880.61	908.00	77946.0	14.763
	596.48					

193.360		917.10	880.87	908.00	78542.5	14.875
	503.55					
193.450		915.60	878.89	908.00	79046.0	14.971
	487.52					
193.540		929.50	879.74	907.99	79533.6	15.063
	564.14					
193.650		938.50	879.51	908.00	80097.7	15.170
	369.98					
193.710		913.60	882.18	911.34	80467.7	15.240
	354.85					
193.780		929.60	882.55	908.00	80822.5	15.307
	441.22					
193.860		945.40	882.80	910.31	81263.8	15.391
	390.60					
193.930		982.20	885.38	912.00	81654.4	15.465
	380.75					
194.010		909.90	885.50	912.00	82035.1	15.537
	457.73					
194.090		916.00	883.90	912.00	82492.8	15.624
	535.18					
194.210		905.30	883.10	917.70	83028.0	15.725
	483.67					
194.290		934.60	896.20	915.60	83511.7	15.817
	616.38					
194.400		917.40	896.00	916.40	84128.1	15.933
	661.08					
194.530		924.70	896.20	919.00	84789.1	16.059
	501.02					
194.620		925.80	896.30	921.30	85290.2	16.153
	503.50					
194.720		929.80	895.70	921.30	85793.7	16.249
	485.00					
194.810		929.70	896.00	923.30	86278.7	16.341
	494.18					
194.910		929.60	896.90	922.00	86772.9	16.434
	489.93					
195.000		929.50	897.00	921.80	87262.8	16.527
	504.00					
195.090		929.50	898.80	923.40	87766.8	16.622
	308.36					
195.160		912.70	900.00	920.80	88075.1	16.681
	185.16					
195.190		929.40	900.70	928.10	88260.3	16.716
	472.67					
195.280		929.90	901.30	930.70	88733.0	16.805
	539.38					
195.380		929.30	902.10	930.10	89272.4	16.908
	472.11					
195.470		929.70	902.50	929.80	89744.5	16.997
	509.15					
195.560		929.20	901.40	926.60	90253.6	17.093
	491.32					
195.660		934.80	903.10	927.50	90744.9	17.187
	495.98					
195.750		939.60	903.40	929.30	91240.9	17.280
	507.21					
195.850		940.20	904.50	930.00	91748.1	17.377
	505.97					
195.940		940.20	904.50	930.50	92254.1	17.472
	497.99					
196.040		934.40	906.20	924.20	92752.1	17.567
	493.22					
196.130		930.80	905.30	928.60	93245.3	17.660
	505.25					
196.230		928.40	906.00	931.10	93750.5	17.756
	514.33					
196.320		929.30	907.00	929.40	94264.9	17.853
	490.39					
196.420		932.20	907.30	930.40	94755.3	17.946
	498.40					
196.510		931.80	908.20	929.90	95253.7	18.040
	508.32					
196.610		932.50	908.50	932.20	95762.0	18.137
	505.46					
196.700		932.00	909.30	932.00	96267.4	18.232
	454.29					
196.790		933.30	910.70	931.80	96721.7	18.319
	502.13					
196.880		934.30	910.80	933.00	97223.9	18.414
	490.37					
196.980		936.90	911.00	933.20	97714.2	18.506
	484.35					
197.070		935.60	913.90	934.30	98198.6	18.598
	499.71					
197.160		937.10	913.90	934.70	98698.3	18.693
	497.32					
197.260		934.80	913.60	933.60	99195.6	18.787
	486.44					
197.350		935.50	914.20	933.90	99682.1	18.879
	502.18					
197.450		939.90	915.60	933.60	100184.2	18.974
	483.58					
197.540		935.20	916.10	932.50	100667.8	19.066
	532.05					
197.640		938.70	918.20	933.20	101199.9	19.167

	522.82					
197.740		939.20	919.10	934.90	101722.7	19.266
	499.47					
197.830		937.80	919.60	935.50	102222.1	19.360
	488.75					
197.920		940.20	920.60	936.60	102710.9	19.453
	501.89					
198.020		940.00	922.80	936.80	103212.8	19.548
	483.89					
198.110		940.10	922.40	937.10	103696.7	19.640
	493.64					
198.200		942.60	918.80	937.30	104190.3	19.733
	300.40					
198.260		942.60	918.70	943.50	104490.7	19.790
	200.38					
198.300		943.60	921.70	940.80	104691.1	19.828
	200.38					
198.340		944.30	922.70	939.40	104891.5	19.866
	308.13					
198.400		944.10	921.50	940.10	105199.6	19.924
	488.90					
198.490		949.70	922.40	940.26	105688.5	20.017
	505.62					
198.590		947.00	922.00	938.80	106194.1	20.113
	326.88					
198.650		947.30	922.00	940.13	106521.0	20.174
	417.70					
198.730		951.70	922.08	943.10	106938.7	20.254
	330.90					
198.790		952.00	922.10	943.40	107269.6	20.316
	367.41					
198.860		950.20	922.70	944.00	107637.0	20.386
	539.93					
198.960		954.40	924.43	947.09	108177.0	20.488
	546.65					
199.070		940.40	923.50	953.50	108723.6	20.592

TABLE SED-5. GRADATION OF BED SEDIMENT RESERVOIR FROM PF-RECORDS.

SEC NO.	SAE	DMAX	DXPI	XPI	PI( )	PI( )	PI( )	PI( )	PI( )
					PI( )	PI( )	PI( )	PI( )	PI( )
178.61	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
178.68	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
178.77	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
178.86	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
178.95	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.03	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.11	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.20	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.25	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.30	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.35	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.40	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.50	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289

					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.59	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.68	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.76	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.84	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
179.91	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.04	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.06	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.09	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.18	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.28	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.37	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.47	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.56	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.65	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.75	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.85	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.94	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
180.99	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.04	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.13	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.23	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.32	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.41	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.51	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024

					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.62	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.74	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.82	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.90	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
181.99	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.08	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.17	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.27	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.36	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.45	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.55	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.64	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.74	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.83	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
182.92	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.02	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.11	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.20	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.30	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.39	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.49	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.58	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.67	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				

183.77	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.86	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
183.96	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.05	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.14	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.24	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.33	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.43	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.53	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.62	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.71	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.81	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
184.90	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.00	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.10	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.19	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.28	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.38	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.46	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.53	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.61	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.71	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.81	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
185.90	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037

					0.0037				
186.00	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.10	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.19	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.27	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.36	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.46	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.55	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.61	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.69	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.78	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.87	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
186.97	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
187.06	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
187.15	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
187.24	1.0000	0.4265	0.4199	0.0001	0.0384	0.0025	0.0025	0.0025	0.0024
					0.0127	0.0340	0.3024	0.4163	0.1289
					0.0388	0.0037	0.0037	0.0037	0.0037
					0.0037				
187.36	1.0000	0.4265	0.4199	0.0001	0.0383	0.0025	0.0025	0.0025	0.0024
					0.0122	0.0329	0.2978	0.4076	0.1280
					0.0429	0.0078	0.0101	0.0047	0.0038
					0.0038				
187.45	1.0000	0.4265	0.4199	0.0001	0.0382	0.0025	0.0025	0.0025	0.0024
					0.0119	0.0320	0.2941	0.4004	0.1272
					0.0463	0.0111	0.0153	0.0056	0.0039
					0.0039				
187.54	1.0000	0.4265	0.4199	0.0001	0.0381	0.0025	0.0025	0.0025	0.0024
					0.0116	0.0312	0.2908	0.3941	0.1266
					0.0493	0.0141	0.0199	0.0063	0.0040
					0.0040				
187.64	1.0000	0.4265	0.4199	0.0001	0.0380	0.0025	0.0025	0.0025	0.0024
					0.0113	0.0303	0.2869	0.3867	0.1258
					0.0527	0.0175	0.0252	0.0072	0.0041
					0.0041				
187.73	1.0000	0.4265	0.4199	0.0001	0.0380	0.0025	0.0025	0.0025	0.0024
					0.0109	0.0294	0.2834	0.3799	0.1251
					0.0559	0.0207	0.0302	0.0080	0.0042
					0.0042				
187.82	1.0000	0.4265	0.4199	0.0001	0.0379	0.0025	0.0025	0.0025	0.0024
					0.0106	0.0285	0.2797	0.3729	0.1244
					0.0592	0.0240	0.0353	0.0088	0.0044
					0.0044				
187.91	1.0000	0.4265	0.4199	0.0001	0.0378	0.0025	0.0025	0.0025	0.0024
					0.0103	0.0277	0.2763	0.3664	0.1237
					0.0623	0.0270	0.0401	0.0096	0.0044
					0.0044				
188.00	1.0000	0.4265	0.4199	0.0001	0.0377	0.0025	0.0025	0.0025	0.0024
					0.0100	0.0268	0.2723	0.3588	0.1230
					0.0659	0.0306	0.0455	0.0105	0.0046
					0.0046				
188.07	1.0000	0.4265	0.4199	0.0001	0.0377	0.0025	0.0025	0.0025	0.0024
					0.0098	0.0262	0.2701	0.3547	0.1225

					0.0678	0.0325	0.0486	0.0110	0.0046
					0.0046				
188.10	1.0000	0.4265	0.4199	0.0001	0.0377	0.0025	0.0025	0.0025	0.0024
					0.0096	0.0259	0.2687	0.3519	0.1222
					0.0691	0.0338	0.0506	0.0113	0.0047
					0.0047				
188.20	1.0000	0.4265	0.4199	0.0001	0.0376	0.0025	0.0025	0.0025	0.0024
					0.0093	0.0249	0.2648	0.3444	0.1215
					0.0727	0.0373	0.0560	0.0122	0.0048
					0.0048				
188.29	1.0000	0.4265	0.4199	0.0001	0.0375	0.0025	0.0025	0.0025	0.0024
					0.0089	0.0241	0.2611	0.3373	0.1208
					0.0760	0.0406	0.0612	0.0130	0.0049
					0.0049				
188.39	1.0000	0.4265	0.4199	0.0001	0.0374	0.0024	0.0024	0.0024	0.0024
					0.0086	0.0231	0.2571	0.3297	0.1200
					0.0796	0.0442	0.0668	0.0139	0.0050
					0.0050				
188.50	1.0000	0.4265	0.4199	0.0001	0.0373	0.0024	0.0024	0.0024	0.0024
					0.0082	0.0220	0.2527	0.3213	0.1191
					0.0835	0.0481	0.0728	0.0149	0.0051
					0.0051				
188.59	1.0000	0.4265	0.4199	0.0001	0.0373	0.0024	0.0024	0.0024	0.0024
					0.0079	0.0211	0.2490	0.3143	0.1184
					0.0868	0.0514	0.0780	0.0157	0.0052
					0.0052				
188.70	1.0000	0.4265	0.4199	0.0001	0.0372	0.0024	0.0024	0.0024	0.0023
					0.0075	0.0202	0.2449	0.3065	0.1176
					0.0905	0.0550	0.0836	0.0166	0.0053
					0.0053				
188.81	1.0000	0.4265	0.4199	0.0001	0.0371	0.0024	0.0024	0.0024	0.0023
					0.0071	0.0191	0.2403	0.2977	0.1167
					0.0946	0.0591	0.0900	0.0176	0.0055
					0.0055				
188.92	1.0000	0.4265	0.4199	0.0001	0.0370	0.0024	0.0024	0.0024	0.0023
					0.0067	0.0181	0.2362	0.2898	0.1159
					0.0983	0.0628	0.0957	0.0186	0.0056
					0.0056				
189.02	1.0000	0.4265	0.4199	0.0001	0.0369	0.0024	0.0024	0.0024	0.0023
					0.0060	0.0162	0.2287	0.2754	0.1144
					0.1051	0.0695	0.1062	0.0203	0.0058
					0.0058				
189.12	1.0000	0.4265	0.4199	0.0001	0.0368	0.0024	0.0024	0.0024	0.0023
					0.0057	0.0153	0.2249	0.2682	0.1136
					0.1085	0.0729	0.1115	0.0211	0.0059
					0.0059				
189.22	1.0000	0.4265	0.4199	0.0001	0.0367	0.0024	0.0024	0.0024	0.0023
					0.0054	0.0144	0.2211	0.2609	0.1129
					0.1119	0.0763	0.1167	0.0220	0.0060
					0.0060				
189.31	1.0000	0.4265	0.4199	0.0001	0.0366	0.0024	0.0024	0.0024	0.0023
					0.0050	0.0136	0.2175	0.2540	0.1122
					0.1151	0.0795	0.1217	0.0228	0.0061
					0.0061				
189.39	1.0000	0.4265	0.4199	0.0001	0.0366	0.0024	0.0024	0.0024	0.0023
					0.0047	0.0128	0.2142	0.2477	0.1115
					0.1181	0.0824	0.1263	0.0235	0.0062
					0.0062				
189.49	1.0000	0.4265	0.4199	0.0001	0.0365	0.0024	0.0024	0.0024	0.0023
					0.0044	0.0118	0.2104	0.2405	0.1108
					0.1215	0.0858	0.1316	0.0244	0.0063
					0.0063				
189.58	1.0000	0.4265	0.4199	0.0001	0.0364	0.0024	0.0024	0.0024	0.0023
					0.0041	0.0109	0.2067	0.2334	0.1101
					0.1249	0.0892	0.1368	0.0252	0.0064
					0.0064				
189.68	1.0000	0.4265	0.4199	0.0001	0.0363	0.0024	0.0024	0.0024	0.0023
					0.0037	0.0100	0.2029	0.2261	0.1093
					0.1283	0.0925	0.1420	0.0261	0.0065
					0.0065				
189.77	1.0000	0.4265	0.4199	0.0001	0.0363	0.0024	0.0024	0.0024	0.0023
					0.0034	0.0091	0.1990	0.2187	0.1086
					0.1318	0.0960	0.1475	0.0269	0.0067
					0.0067				
189.87	1.0000	0.4265	0.4199	0.0002	0.0362	0.0024	0.0024	0.0024	0.0023
					0.0030	0.0081	0.1949	0.2109	0.1078
					0.1354	0.0996	0.1531	0.0279	0.0068
					0.0068				
189.96	1.0000	0.4265	0.4199	0.0002	0.0361	0.0024	0.0024	0.0024	0.0023
					0.0027	0.0072	0.1912	0.2038	0.1070
					0.1388	0.1030	0.1583	0.0287	0.0069
					0.0069				
190.05	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.15	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.24	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.34	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023

					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.43	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.53	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.62	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.71	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.80	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.89	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
190.99	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.08	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.17	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.27	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.36	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.46	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.55	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.65	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.75	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.84	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
191.94	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.04	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.13	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.23	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.33	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.42	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.51	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				

192.60	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.69	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.78	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.88	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
192.97	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.07	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.16	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.24	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.36	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.45	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.54	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.65	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.71	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.78	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.86	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
193.93	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.01	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.09	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.21	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.29	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.40	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.53	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.62	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.72	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070

					0.0070				
194.81	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
194.91	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.00	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.09	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.16	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.19	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.28	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.38	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.47	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.56	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.66	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.75	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.85	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
195.94	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.04	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.13	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.23	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.32	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.42	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.51	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.61	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.70	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.79	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.88	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063

					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
196.98	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.07	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.16	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.26	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.35	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.45	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.54	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.64	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.74	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.83	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
197.92	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.02	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.11	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.20	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.26	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.30	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.34	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.40	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.49	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.59	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.65	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.73	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.79	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023
					0.0024	0.0063	0.1875	0.1968	0.1063
					0.1420	0.1062	0.1634	0.0295	0.0070
					0.0070				
198.86	1.0000	0.4265	0.4199	0.0002	0.0360	0.0024	0.0024	0.0024	0.0023

```
                                        0.0024  0.0063  0.1875  0.1968  0.1063
                                        0.1420  0.1062  0.1634  0.0295  0.0070
                                        0.0070
198.96   1.0000  0.4265  0.4199  0.0002 0.0360  0.0024  0.0024  0.0024  0.0023
                                        0.0024  0.0063  0.1875  0.1968  0.1063
                                        0.1420  0.1062  0.1634  0.0295  0.0070
                                        0.0070
199.07   1.0000  0.4265  0.4199  0.0002 0.0360  0.0024  0.0024  0.0024  0.0023
                                        0.0024  0.0063  0.1875  0.1968  0.1063
                                        0.1420  0.1062  0.1634  0.0295  0.0070
                                        0.0070


ACTIVE DEPOSITS, WT.  IN TONS

NONE SPECIFIED, ASSUMED ZERO

LOCAL INFLOW DATA...


TABLE SED-3.  Q-QS RATING TABLE
THIS SEDIMENT DISCHARGE TABLE CONTAINS   2 WATER DISCHARGES.
     IT IS FOR SEGMENT NUMBER            1
     AT LOCAL INFLOW POINT NO.           1
LOAD BY GRAIN SIZE CLASS, TONS/DAY

LQL    Q* 100.000     * 50000.0     *
LFLCLAY1* 10.0000     *0.293000E+07*
LFLSILT1* 1.50000     * 439500.     *
LFLSILT2* 1.50000     * 439500.     *
LFLSILT3* 1.50000     * 439500.     *
LFLSILT4* 1.50000     * 439500.     *
LFL  VFS* 1.00000     * 293000.     *
LFL   FS* 1.00000     * 293000.     *
LFL   MS*0.800000     * 234400.     *
LFL   CS*0.800000     * 234400.     *
LFL  VCS*0.400000     * 117200.     *
LFL  VFG*0.100000E-19*0.100000E-19*
LFL   FG*0.100000E-19*0.100000E-19*
LFL   MG*0.100000E-19*0.100000E-19*
LFL   CG*0.100000E-19*0.100000E-19*
LFL  VCG*0.100000E-19*0.100000E-19*
LFL   SC*0.100000E-19*0.100000E-19*
          ----------   ----------
    SUM=* 20.0000     *0.586000E+07*


TABLE SED-8. DIMENSIONS OF BED SEDIMENT CONTROL VOLUMES, FEET.
SEGMENT #  1:  Rio Watercourse Master Plan 82000240
SEC. NO.  *   LENGTH    * MAX. WIDTH *   DEPTH     *       V O L U M E       *
                                                   *   CU. FT.  *   CU. YD.  *

178.61    * 189.170    * 12455.0    * 10.0000    *0.235611E+08* 872634.    *
178.68    * 411.375    * 12400.2    * 10.0000    *0.510115E+08*0.188931E+07*
178.77    * 461.195    * 12337.1    * 10.0000    *0.568983E+08*0.210734E+07*
178.86    * 474.090    * 12666.2    * 10.0000    *0.600492E+08*0.222404E+07*
178.95    * 443.515    * 12094.1    * 10.0000    *0.536392E+08*0.198664E+07*
179.03    * 421.315    * 12416.3    * 10.0000    *0.523117E+08*0.193747E+07*
179.11    * 461.425    * 13024.1    * 10.0000    *0.600966E+08*0.222580E+07*
179.20    * 378.230    * 13006.8    * 10.0000    *0.491958E+08*0.182207E+07*
179.25    * 258.940    * 13151.6    * 10.0000    *0.340546E+08*0.126128E+07*
179.30    * 259.845    * 13264.0    * 10.0000    *0.344658E+08*0.127651E+07*
179.35    * 261.855    * 13499.6    * 10.0000    *0.353493E+08*0.130923E+07*
179.40    * 384.460    * 13564.9    * 10.0000    *0.521516E+08*0.193154E+07*
179.50    * 505.325    * 13909.9    * 10.0000    *0.702902E+08*0.260334E+07*
179.59    * 499.600    * 13714.9    * 10.0000    *0.685196E+08*0.253776E+07*
179.68    * 448.155    * 13830.2    * 10.0000    *0.619807E+08*0.229558E+07*
179.76    * 400.625    * 13381.5    * 10.0000    *0.536096E+08*0.198554E+07*
179.84    * 404.825    * 13791.8    * 10.0000    *0.558328E+08*0.206788E+07*
179.91    * 507.415    * 12414.4    * 10.0000    *0.629923E+08*0.233305E+07*
180.04    * 381.160    * 8638.84    * 10.0000    *0.329278E+08*0.121955E+07*
180.06    * 156.850    * 12175.0    * 10.0000    *0.190965E+08* 707276.    *
180.09    * 326.120    * 13245.6    * 10.0000    *0.431965E+08*0.159987E+07*
180.18    * 501.780    * 13162.5    * 10.0000    *0.660466E+08*0.244617E+07*
180.28    * 509.015    * 13279.9    * 10.0000    *0.675969E+08*0.250359E+07*
180.37    * 504.300    * 13386.2    * 10.0000    *0.675067E+08*0.250025E+07*
180.47    * 495.610    * 13904.0    * 10.0000    *0.689097E+08*0.255221E+07*
180.56    * 488.030    * 13592.1    * 10.0000    *0.663334E+08*0.245679E+07*
180.65    * 495.670    * 13389.0    * 10.0000    *0.663653E+08*0.245798E+07*
180.75    * 516.355    * 13408.4    * 10.0000    *0.692351E+08*0.256426E+07*
180.85    * 502.155    * 13139.9    * 10.0000    *0.659825E+08*0.244380E+07*
180.94    * 376.120    * 12696.1    * 10.0000    *0.477526E+08*0.176862E+07*
180.99    * 251.125    * 12848.0    * 10.0000    *0.322646E+08*0.119499E+07*
181.04    * 362.925    * 13106.5    * 10.0000    *0.475669E+08*0.176174E+07*
181.13    * 504.585    * 13099.9    * 10.0000    *0.661003E+08*0.244816E+07*
181.23    * 503.215    * 13247.8    * 10.0000    *0.666647E+08*0.246906E+07*
181.32    * 495.420    * 13017.5    * 10.0000    *0.644915E+08*0.238858E+07*
181.41    * 509.300    * 12294.9    * 10.0000    *0.626179E+08*0.231918E+07*
181.51    * 536.325    * 11561.1    * 10.0000    *0.620049E+08*0.229648E+07*
181.62    * 588.575    * 11451.8    * 10.0000    *0.674026E+08*0.249639E+07*
181.74    * 544.495    * 11319.2    * 10.0000    *0.616322E+08*0.228268E+07*
181.82    * 438.735    * 10698.6    * 10.0000    *0.469387E+08*0.173847E+07*
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181.90	* 428.845	* 10559.0	* 10.0000	*0.452816E+08*0.167710E+07*
181.99	* 476.340	* 10047.0	* 10.0000	*0.478576E+08*0.177251E+07*
182.08	* 490.270	* 9965.75	* 10.0000	*0.488591E+08*0.180960E+07*
182.17	* 483.855	* 10170.7	* 10.0000	*0.492113E+08*0.182264E+07*
182.27	* 494.795	* 9710.19	* 10.0000	*0.480455E+08*0.177946E+07*
182.36	* 493.290	* 9519.61	* 10.0000	*0.469593E+08*0.173923E+07*
182.45	* 500.610	* 9769.49	* 10.0000	*0.489070E+08*0.181137E+07*
182.55	* 503.335	* 10299.7	* 10.0000	*0.518419E+08*0.192007E+07*
182.64	* 495.415	* 10804.0	* 10.0000	*0.535247E+08*0.198240E+07*
182.74	* 491.800	* 11344.1	* 10.0000	*0.557902E+08*0.206630E+07*
182.83	* 493.975	* 10629.7	* 10.0000	*0.525078E+08*0.194473E+07*
182.92	* 495.485	* 11098.2	* 10.0000	*0.549900E+08*0.203667E+07*
183.02	* 494.450	* 11353.9	* 10.0000	*0.561394E+08*0.207924E+07*
183.11	* 494.955	* 11310.0	* 10.0000	*0.559796E+08*0.207332E+07*
183.20	* 497.750	* 11125.6	* 10.0000	*0.553778E+08*0.205103E+07*
183.30	* 496.165	* 10868.0	* 10.0000	*0.539232E+08*0.199716E+07*
183.39	* 499.455	* 10921.1	* 10.0000	*0.545461E+08*0.202023E+07*
183.49	* 499.940	* 10975.1	* 10.0000	*0.548687E+08*0.203218E+07*
183.58	* 491.180	* 11382.7	* 10.0000	*0.559097E+08*0.207073E+07*
183.67	* 500.185	* 10904.9	* 10.0000	*0.545449E+08*0.202018E+07*
183.77	* 498.185	* 11167.4	* 10.0000	*0.556345E+08*0.206054E+07*
183.86	* 485.405	* 11351.8	* 10.0000	*0.551024E+08*0.204083E+07*
183.96	* 494.980	* 11251.3	* 10.0000	*0.556915E+08*0.206265E+07*
184.05	* 498.960	* 11554.3	* 10.0000	*0.576516E+08*0.213524E+07*
184.14	* 498.980	* 11797.9	* 10.0000	*0.588690E+08*0.218033E+07*
184.24	* 501.975	* 11477.9	* 10.0000	*0.576160E+08*0.213393E+07*
184.33	* 502.725	* 10941.9	* 10.0000	*0.550079E+08*0.203733E+07*
184.43	* 507.230	* 11458.7	* 10.0000	*0.581219E+08*0.215266E+07*
184.53	* 508.645	* 12040.9	* 10.0000	*0.612455E+08*0.226835E+07*
184.62	* 494.740	* 12518.4	* 10.0000	*0.619337E+08*0.229384E+07*
184.71	* 493.390	* 13322.5	* 10.0000	*0.657320E+08*0.243452E+07*
184.81	* 489.925	* 14144.0	* 10.0000	*0.692950E+08*0.256648E+07*
184.90	* 495.365	* 13699.4	* 10.0000	*0.678619E+08*0.251340E+07*
185.00	* 530.580	* 13097.7	* 10.0000	*0.694940E+08*0.257385E+07*
185.10	* 510.930	* 13190.2	* 10.0000	*0.673926E+08*0.249602E+07*
185.19	* 479.705	* 13466.1	* 10.0000	*0.645974E+08*0.239249E+07*
185.28	* 490.080	* 13349.9	* 10.0000	*0.654250E+08*0.242315E+07*
185.38	* 472.345	* 13493.5	* 10.0000	*0.637358E+08*0.236058E+07*
185.46	* 415.875	* 13633.3	* 10.0000	*0.566974E+08*0.209990E+07*
185.53	* 397.750	* 13712.7	* 10.0000	*0.545424E+08*0.202009E+07*
185.61	* 465.775	* 13857.7	* 10.0000	*0.645457E+08*0.239058E+07*
185.71	* 513.730	* 14235.0	* 10.0000	*0.731296E+08*0.270851E+07*
185.81	* 513.700	* 14101.9	* 10.0000	*0.724416E+08*0.268302E+07*
185.90	* 514.560	* 14293.8	* 10.0000	*0.735500E+08*0.272407E+07*
186.00	* 507.265	* 13993.1	* 10.0000	*0.709822E+08*0.262897E+07*
186.10	* 509.980	* 14513.1	* 10.0000	*0.740141E+08*0.274126E+07*
186.19	* 469.455	* 14569.1	* 10.0000	*0.683954E+08*0.253316E+07*
186.27	* 448.295	* 14278.6	* 10.0000	*0.640102E+08*0.237075E+07*
186.36	* 482.865	* 14789.6	* 10.0000	*0.714138E+08*0.264496E+07*
186.46	* 492.200	* 14958.2	* 10.0000	*0.736244E+08*0.272683E+07*
186.55	* 390.105	* 13524.8	* 10.0000	*0.527611E+08*0.195411E+07*
186.61	* 372.935	* 13381.1	* 10.0000	*0.499029E+08*0.184826E+07*
186.69	* 458.080	* 13422.7	* 10.0000	*0.614867E+08*0.227729E+07*
186.78	* 477.495	* 13583.3	* 10.0000	*0.648596E+08*0.240221E+07*
186.87	* 490.940	* 13881.2	* 10.0000	*0.681481E+08*0.252401E+07*
186.97	* 489.425	* 14204.4	* 10.0000	*0.695198E+08*0.257481E+07*
187.06	* 496.220	* 13968.2	* 10.0000	*0.693131E+08*0.256715E+07*
187.15	* 491.180	* 13925.9	* 10.0000	*0.684014E+08*0.253338E+07*
187.24	* 545.515	* 13803.4	* 10.0000	*0.752998E+08*0.278888E+07*
187.36	* 555.305	* 15389.2	* 10.0000	*0.854570E+08*0.316507E+07*
187.45	* 472.645	* 15680.3	* 10.0000	*0.741120E+08*0.274489E+07*
187.54	* 479.055	* 16057.6	* 10.0000	*0.769245E+08*0.284906E+07*
187.64	* 493.905	* 15513.5	* 10.0000	*0.766219E+08*0.283785E+07*
187.73	* 482.665	* 15420.5	* 10.0000	*0.744295E+08*0.275665E+07*
187.82	* 473.705	* 15029.2	* 10.0000	*0.711942E+08*0.263682E+07*
187.91	* 491.435	* 14859.0	* 10.0000	*0.730222E+08*0.270453E+07*
188.00	* 408.165	* 14339.1	* 10.0000	*0.585271E+08*0.216767E+07*
188.07	* 241.865	* 9757.56	* 10.0000	*0.236001E+08* 874079. *
188.10	* 359.435	* 13849.4	* 10.0000	*0.497796E+08*0.184369E+07*
188.20	* 508.795	* 14201.0	* 10.0000	*0.722541E+08*0.267608E+07*
188.29	* 514.435	* 13936.9	* 10.0000	*0.716964E+08*0.265542E+07*
188.39	* 558.945	* 14077.3	* 10.0000	*0.786841E+08*0.291423E+07*
188.50	* 537.565	* 14090.8	* 10.0000	*0.757471E+08*0.280545E+07*
188.59	* 518.145	* 14265.8	* 10.0000	*0.739177E+08*0.273769E+07*
188.70	* 577.800	* 14732.9	* 10.0000	*0.851264E+08*0.315283E+07*
188.81	* 581.900	* 14926.9	* 10.0000	*0.868596E+08*0.321702E+07*
188.92	* 779.310	* 14802.0	* 10.0000	*0.115354E+09*0.427235E+07*
189.02	* 755.205	* 14907.2	* 10.0000	*0.112580E+09*0.416964E+07*
189.12	* 505.245	* 14335.1	* 10.0000	*0.724272E+08*0.268249E+07*
189.22	* 494.315	* 14116.5	* 10.0000	*0.697799E+08*0.258444E+07*
189.31	* 460.690	* 14112.8	* 10.0000	*0.650160E+08*0.240800E+07*
189.39	* 474.210	* 13970.9	* 10.0000	*0.662512E+08*0.245375E+07*
189.49	* 502.465	* 13737.3	* 10.0000	*0.690249E+08*0.255648E+07*
189.58	* 500.255	* 13707.3	* 10.0000	*0.685714E+08*0.253968E+07*
189.68	* 513.375	* 13700.8	* 10.0000	*0.703362E+08*0.260505E+07*
189.77	* 532.350	* 13963.9	* 10.0000	*0.743366E+08*0.275321E+07*
189.87	* 519.455	* 13489.2	* 10.0000	*0.700703E+08*0.259520E+07*
189.96	* 491.285	* 13203.0	* 10.0000	*0.648644E+08*0.240239E+07*
190.05	* 499.995	* 13229.3	* 10.0000	*0.661460E+08*0.244985E+07*
190.15	* 505.360	* 13741.7	* 10.0000	*0.694450E+08*0.257204E+07*
190.24	* 502.835	* 12899.9	* 10.0000	*0.648653E+08*0.240242E+07*
190.34	* 508.225	* 12405.6	* 10.0000	*0.630483E+08*0.233512E+07*
190.43	* 499.130	* 12210.1	* 10.0000	*0.609442E+08*0.225719E+07*
190.53	* 503.015	* 11850.4	* 10.0000	*0.596095E+08*0.220776E+07*
190.62	* 504.495	* 11670.1	* 10.0000	*0.588752E+08*0.218056E+07*

190.71	* 488.735	* 12639.4	* 10.0000	*0.617732E+08*0.228790E+07*
190.80	* 484.435	* 12657.5	* 10.0000	*0.613174E+08*0.227101E+07*
190.89	* 501.120	* 12426.3	* 10.0000	*0.622704E+08*0.230631E+07*
190.99	* 501.355	* 9772.58	* 10.0000	*0.489953E+08*0.181464E+07*
191.08	* 493.660	* 11496.3	* 10.0000	*0.567528E+08*0.210196E+07*
191.17	* 498.670	* 11807.9	* 10.0000	*0.588824E+08*0.218083E+07*
191.27	* 495.180	* 12102.6	* 10.0000	*0.599297E+08*0.221962E+07*
191.36	* 503.810	* 12192.6	* 10.0000	*0.614273E+08*0.227508E+07*
191.46	* 499.075	* 12356.4	* 10.0000	*0.616675E+08*0.228398E+07*
191.55	* 478.425	* 12214.3	* 10.0000	*0.584365E+08*0.216431E+07*
191.65	* 504.145	* 11897.5	* 10.0000	*0.599807E+08*0.222151E+07*
191.75	* 515.370	* 12062.8	* 10.0000	*0.621679E+08*0.230252E+07*
191.84	* 505.895	* 11705.9	* 10.0000	*0.592198E+08*0.219333E+07*
191.94	* 514.930	* 11131.5	* 10.0000	*0.573197E+08*0.212295E+07*
192.04	* 497.440	* 10867.7	* 10.0000	*0.540603E+08*0.200223E+07*
192.13	* 499.105	* 10536.7	* 10.0000	*0.525893E+08*0.194775E+07*
192.23	* 513.010	* 9815.26	* 10.0000	*0.503533E+08*0.186494E+07*
192.33	* 510.850	* 10411.9	* 10.0000	*0.531892E+08*0.196997E+07*
192.42	* 497.980	* 10347.0	* 10.0000	*0.515259E+08*0.190837E+07*
192.51	* 485.895	* 9576.30	* 10.0000	*0.465308E+08*0.172336E+07*
192.60	* 499.215	* 8841.99	* 10.0000	*0.441406E+08*0.163484E+07*
192.69	* 508.640	* 8532.38	* 10.0000	*0.433991E+08*0.160737E+07*
192.78	* 524.515	* 8608.47	* 10.0000	*0.451527E+08*0.167232E+07*
192.88	* 516.660	* 8545.62	* 10.0000	*0.441518E+08*0.163525E+07*
192.97	* 520.920	* 8298.01	* 10.0000	*0.432260E+08*0.160096E+07*
193.07	* 522.195	* 8729.77	* 10.0000	*0.455864E+08*0.168839E+07*
193.16	* 462.890	* 8845.37	* 10.0000	*0.409443E+08*0.151646E+07*
193.24	* 514.360	* 8600.38	* 10.0000	*0.442369E+08*0.163841E+07*
193.36	* 550.015	* 8385.99	* 10.0000	*0.461242E+08*0.170830E+07*
193.45	* 495.535	* 7585.08	* 10.0000	*0.375867E+08*0.139210E+07*
193.54	* 525.830	* 7100.42	* 10.0000	*0.373362E+08*0.138282E+07*
193.65	* 467.060	* 6633.19	* 10.0000	*0.309810E+08*0.114744E+07*
193.71	* 362.415	* 5042.81	* 10.0000	*0.182759E+08* 676885. *
193.78	* 398.035	* 7291.64	* 10.0000	*0.290233E+08*0.107494E+07*
193.86	* 415.910	* 8313.06	* 10.0000	*0.345748E+08*0.128055E+07*
193.93	* 385.675	* 8729.51	* 10.0000	*0.336675E+08*0.124695E+07*
194.01	* 419.240	* 9029.87	* 10.0000	*0.378568E+08*0.140210E+07*
194.09	* 496.455	* 8520.09	* 10.0000	*0.422984E+08*0.156661E+07*
194.21	* 509.425	* 5196.62	* 10.0000	*0.264729E+08* 980477. *
194.29	* 550.025	* 8462.89	* 10.0000	*0.465480E+08*0.172400E+07*
194.40	* 638.730	* 9384.61	* 10.0000	*0.599423E+08*0.222009E+07*
194.53	* 581.050	* 9837.25	* 10.0000	*0.571594E+08*0.211701E+07*
194.62	* 502.260	* 9678.06	* 10.0000	*0.486090E+08*0.180033E+07*
194.72	* 494.250	* 9150.59	* 10.0000	*0.452268E+08*0.167507E+07*
194.81	* 489.590	* 8924.72	* 10.0000	*0.436945E+08*0.161832E+07*
194.91	* 492.055	* 9010.67	* 10.0000	*0.443374E+08*0.164213E+07*
195.00	* 496.965	* 9075.90	* 10.0000	*0.451040E+08*0.167052E+07*
195.09	* 406.180	* 8825.28	* 10.0000	*0.358465E+08*0.132765E+07*
195.16	* 246.760	* 7904.93	* 10.0000	*0.195062E+08* 722452. *
195.19	* 328.915	* 9122.96	* 10.0000	*0.300068E+08*0.111136E+07*
195.28	* 506.025	* 9444.81	* 10.0000	*0.477931E+08*0.177012E+07*
195.38	* 505.745	* 9581.22	* 10.0000	*0.484565E+08*0.179469E+07*
195.47	* 490.630	* 9115.09	* 10.0000	*0.447214E+08*0.165635E+07*
195.56	* 500.235	* 8311.68	* 10.0000	*0.415779E+08*0.153992E+07*
195.66	* 493.650	* 8039.99	* 10.0000	*0.396894E+08*0.146998E+07*
195.75	* 501.595	* 7774.22	* 10.0000	*0.389951E+08*0.144426E+07*
195.85	* 506.590	* 8377.28	* 10.0000	*0.424385E+08*0.157179E+07*
195.94	* 501.980	* 9344.65	* 10.0000	*0.469083E+08*0.173734E+07*
196.04	* 495.605	* 10092.7	* 10.0000	*0.500200E+08*0.185259E+07*
196.13	* 499.235	* 10863.7	* 10.0000	*0.542356E+08*0.200872E+07*
196.23	* 509.790	* 10943.7	* 10.0000	*0.557897E+08*0.206628E+07*
196.32	* 502.360	* 10276.9	* 10.0000	*0.516268E+08*0.191210E+07*
196.42	* 494.395	* 10548.0	* 10.0000	*0.521487E+08*0.193143E+07*
196.51	* 503.360	* 10732.0	* 10.0000	*0.540206E+08*0.200076E+07*
196.61	* 506.890	* 10464.5	* 10.0000	*0.530434E+08*0.196457E+07*
196.70	* 479.875	* 11040.7	* 10.0000	*0.529816E+08*0.196228E+07*
196.79	* 478.210	* 10711.7	* 10.0000	*0.512245E+08*0.189721E+07*
196.88	* 496.250	* 10076.7	* 10.0000	*0.500058E+08*0.185207E+07*
196.98	* 487.360	* 9824.82	* 10.0000	*0.478823E+08*0.177342E+07*
197.07	* 492.030	* 9868.25	* 10.0000	*0.485548E+08*0.179832E+07*
197.16	* 498.515	* 10138.5	* 10.0000	*0.505421E+08*0.187193E+07*
197.26	* 491.880	* 11278.3	* 10.0000	*0.554759E+08*0.205466E+07*
197.35	* 494.310	* 11176.0	* 10.0000	*0.552439E+08*0.204607E+07*
197.45	* 492.880	* 11054.3	* 10.0000	*0.544845E+08*0.201794E+07*
197.54	* 507.815	* 11062.4	* 10.0000	*0.561767E+08*0.208062E+07*
197.64	* 527.435	* 11071.6	* 10.0000	*0.583956E+08*0.216280E+07*
197.74	* 511.145	* 11194.3	* 10.0000	*0.572189E+08*0.211922E+07*
197.83	* 494.110	* 11364.0	* 10.0000	*0.561509E+08*0.207966E+07*
197.92	* 495.320	* 11441.1	* 10.0000	*0.566698E+08*0.209888E+07*
198.02	* 492.890	* 11369.9	* 10.0000	*0.560412E+08*0.207560E+07*
198.11	* 488.765	* 10716.5	* 10.0000	*0.523783E+08*0.193994E+07*
198.20	* 397.020	* 11420.3	* 10.0000	*0.453408E+08*0.167929E+07*
198.26	* 250.390	* 12737.0	* 10.0000	*0.318923E+08*0.118120E+07*
198.30	* 200.380	* 12826.5	* 10.0000	*0.257018E+08* 951917. *
198.34	* 254.255	* 12924.7	* 10.0000	*0.328618E+08*0.121710E+07*
198.40	* 398.515	* 12921.3	* 10.0000	*0.514933E+08*0.190716E+07*
198.49	* 497.260	* 13145.5	* 10.0000	*0.653674E+08*0.242102E+07*
198.59	* 416.250	* 13199.5	* 10.0000	*0.549428E+08*0.203492E+07*
198.65	* 372.290	* 13217.3	* 10.0000	*0.492066E+08*0.182247E+07*
198.73	* 374.300	* 13171.9	* 10.0000	*0.493024E+08*0.182601E+07*
198.79	* 349.155	* 13021.2	* 10.0000	*0.454643E+08*0.168386E+07*
198.86	* 453.670	* 12449.0	* 10.0000	*0.564773E+08*0.209175E+07*
198.96	* 543.290	* 12219.5	* 10.0000	*0.663875E+08*0.245880E+07*
199.07	* 273.325	* 11891.6	* 10.0000	*0.325026E+08*0.120380E+07*

```
 NO. OF INPUT DATA MESSAGES=      0

 END OF SEDIMENT DATA
1
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$HYD

BEGIN HYDRAULIC CALCULATIONS.
WATER SURFACE PROFILE CALCULATIONS CONVERGE TO. 0.05000 FT

$SMOOTH       ON
SMOOTH AFTER THIS EVENT AND AFTER EVERY   100 WATER SURFACE PROFILES.

USE THE FOLLOWING PROPERTIES TO TEST FOR SLOPE FAILURES.
                                          VALUE BY SEGMENT
        PROPERTY                    |   DEFAULT|SEGMENT  1|SEGMENT
|SOIL FRICTION ANGLE, DEG           |    18.260|    18.260|
|CRITICAL SAFETY FACTOR             |     1.000|     1.000|

$RATING 1
DOWNSTREAM BOUNDARY CONDITION SPECIFIED BY A RATING CURVE.
CONTROL PT=    1 ELEVATION OF GAGE ZERO                    0.00
DISCHARGE CORRESPONDING TO LOWEST ELEVATION IN TABLE    12000.0
DISCHARGE INTERVAL ,                              35X    4700.0
NO. OF POINTS IN RATING TABLE ,                   25X        40
ELEVATIONS    806.30   807.00   807.60   808.00   808.30   808.60   808.90   809.20
   809.40   809.70   809.90   810.10   810.40   810.60   810.80   811.00
   811.10   811.30   811.50   811.70   811.90   812.00   812.20   812.40
   812.50   812.70   812.80   813.00   813.10   813.30   813.40   813.60
   813.70   813.80   814.00   814.10   814.20   814.30   814.50   814.60


EVENT      1 =     0.000000 DAYS TO     1.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
    1.00           199.070*  1382.84                  *   319.12                   *    74.35                   *
                   199.070*  1287.19                  *   356.45                   *   166.09                   *
        TOTAL=     178.610*  2670.03  2670.03    0.00*   675.57   675.57    0.00*   240.43    90.09    0.63*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2432

EVENT      2 =     1.000000 DAYS TO     2.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
    2.00           199.070*  3278.41                  *   756.56                   *   176.26                   *
                   199.070*  1290.40                  *   357.34                   *   166.50                   *
        TOTAL=     178.610*  4568.81  4568.81    0.00*  1113.90  1113.90    0.00*   342.76   164.68    0.52*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2640

EVENT      3 =     1.999999 DAYS TO     3.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
    3.00           199.070*  5173.98                  *  1194.00                   *   278.17                   *
                   199.070*  1499.20                  *   415.16                   *   193.45                   *
```

```
        TOTAL=      178.610*   6673.18   6673.18       0.00*   1609.16   1609.16       0.00*    471.62    285.08       0.40*
                            *                                 *                                 *                                 *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2472

EVENT      4 =     2.999998 DAYS TO     4.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************************
*
                            *                                 *                                 *                                 *
    TIME              ENTRY *             CLAY                *             SILT                *             SAND                *
    DAYS              POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
    4.00             199.070*   5618.88                     *   1296.67                     *    302.09                     *
                     199.070*   1839.52                     *    509.41                     *    237.36                     *
        TOTAL=       178.610*   7458.41   7458.41       0.00*   1806.07   1806.07       0.00*    539.45    339.74       0.37*
                            *                                 *                                 *                                 *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2833

EVENT      5 =     4.000002 DAYS TO     5.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************************
*
                            *                                 *                                 *                                 *
    TIME              ENTRY *             CLAY                *             SILT                *             SAND                *
    DAYS              POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
    5.00             199.070*   8795.18                     *   2029.66                     *    472.86                     *
                     199.070*   1839.54                     *    509.41                     *    237.36                     *
        TOTAL=       178.610*  10634.72  10634.72       0.00*   2539.07   2539.07       0.00*    710.22    519.41       0.27*
                            *                                 *                                 *                                 *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2399

EVENT      6 =     4.999996 DAYS TO     6.000000 DAYS IN    20 COMPUTATION STEPS.
POS| 42   0.5729|*********|*********| 808.9057| 816.0000| 814.4057|
                 AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT            6 WSP         101


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************************
*
                            *                                 *                                 *                                 *
    TIME              ENTRY *             CLAY                *             SILT                *             SAND                *
    DAYS              POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
    6.00             199.070*  10852.77                     *   2504.49                     *    583.48                     *
                     199.070*   1840.11                     *    509.57                     *    237.43                     *
        TOTAL=       178.610*  12692.89  12692.90       0.00*   3014.06   3014.06       0.00*    820.92    650.19       0.21*
                            *                                 *                                 *                                 *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2540

EVENT      7 =     6.000000 DAYS TO     7.000000 DAYS IN    20 COMPUTATION STEPS.
```

```
TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME                ENTRY *          CLAY      *          SILT            *          SAND            *
    DAYS                POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
    7.00               199.070* 14683.69            *  3388.55                 *   789.45                  *
                       199.070*  1840.13            *   509.57                 *   237.44                  *
        TOTAL=         178.610* 16523.82 16523.84 0.00*  3898.12  3898.12 0.00*  1026.88   887.67    0.14*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2311

EVENT      8 =      7.000004 DAYS TO      8.000000 DAYS IN     20 COMPUTATION STEPS.
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT      8 QW=     95500.0 SEGMENT   1 ASN= 194.09
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT      8 QW=     95500.0 SEGMENT   1 ASN= 194.09
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT      8 QW=     95500.0 SEGMENT   1 ASN= 194.09
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT      8 QW=     95500.0 SEGMENT   1 ASN= 194.09
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT      8 QW=     95500.0 SEGMENT   1 ASN= 194.09
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT      8 QW=     95500.0 SEGMENT   1 ASN= 194.09
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT      8 QW=     95500.0 SEGMENT   1 ASN= 194.09


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME                ENTRY *          CLAY      *          SILT            *          SAND            *
    DAYS                POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
    8.00               199.070* 21938.54            *  5062.74                 *  1179.49                  *
                       199.070*  1840.53            *   509.68                 *   237.49                  *
        TOTAL=         178.610* 23779.06 23779.09 0.00*  5572.43  5572.43 0.00*  1416.98  1330.72    0.06*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2084

EVENT      9 =      7.999998 DAYS TO      9.000000 DAYS IN     20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME                ENTRY *          CLAY      *          SILT            *          SAND            *
    DAYS                POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
    9.00               199.070* 22892.26            *  5282.83                 *  1230.77                  *
                       199.070*  1844.22            *   510.71                 *   237.96                  *
        TOTAL=         178.610* 24736.47 24736.48 0.00*  5793.54  5793.54 0.00*  1468.73  1395.92    0.05*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2780

EVENT     10 =      9.000002 DAYS TO     10.000000 DAYS IN     20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME                ENTRY *          CLAY      *          SILT            *          SAND            *
    DAYS                POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
```

```
   10.00            199.070*  32749.74                    *   7557.64                    *   1760.74                    *
                    199.070*   1844.23                    *    510.71                    *    237.96                    *
        TOTAL=      178.610*  34593.97  34593.97      0.00*   8068.35   8068.34      0.00*   1998.70   1921.40      0.04*
                              *                            *                              *                              *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1965

EVENT     11 =    10.000006 DAYS TO    11.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.8791| 810.8393| 816.6797|
                 AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT           11 WSP         201


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
            (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************************
*
                              *                            *                              *                              *
    TIME              ENTRY *            CLAY            *            SILT              *             SAND             *
    DAYS              POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   11.00            199.070*  38931.62                    *   8984.22                    *   2093.10                    *
                    199.070*   1844.48                    *    510.78                    *    238.00                    *
        TOTAL=      178.610*  40776.11  40776.09      0.00*   9495.00   9495.00      0.00*   2331.10   2224.56      0.05*
                              *                            *                              *                              *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2097

EVENT     12 =    10.999990 DAYS TO    12.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
            (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************************
*
                              *                            *                              *                              *
    TIME              ENTRY *            CLAY            *            SILT              *             SAND             *
    DAYS              POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   12.00            199.070*  41611.14                    *   9602.57                    *   2237.16                    *
                    199.070*   1871.39                    *    518.23                    *    241.47                    *
        TOTAL=      178.610*  43482.54  43482.49      0.00*  10120.81  10120.80      0.00*   2478.63   2376.71      0.04*
                              *                            *                              *                              *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2330

EVENT     13 =    11.999994 DAYS TO    13.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
            (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************************
*
                              *                            *                              *                              *
    TIME              ENTRY *            CLAY            *            SILT              *             SAND             *
    DAYS              POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   13.00            199.070*  42510.32                    *   9810.08                    *   2285.50                    *
                    199.070*   2043.54                    *    565.90                    *    263.68                    *
        TOTAL=      178.610*  44553.85  44553.81      0.00*  10375.98  10375.96      0.00*   2549.18   2441.61      0.04*
                              *                            *                              *                              *
*****************************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2583
```

```
EVENT     14 =    12.999998 DAYS TO    14.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *          CLAY            *          SILT            *          SAND            *
    DAYS            POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
   14.00           199.070* 43207.96                   *  9971.07                    *  2323.01                    *
                   199.070*  2104.70                   *   582.84                    *   271.57                    *
        TOTAL=     178.610* 45312.66 45312.61      0.00* 10553.91 10553.90      0.00* 2594.58  2485.99      0.04*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2739

EVENT     15 =    14.000002 DAYS TO    15.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *          CLAY            *          SILT            *          SAND            *
    DAYS            POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
   15.00           199.070* 44161.68                   * 10191.16                    *  2374.28                    *
                   199.070*  2105.28                   *   583.00                    *   271.65                    *
        TOTAL=     178.610* 46266.96 46266.88      0.00* 10774.16 10774.14      0.00* 2645.93  2532.65      0.04*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2744

EVENT     16 =    15.000006 DAYS TO    16.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.8057| 810.5088| 816.3492|
                AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT          16 WSP         301


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *          CLAY            *          SILT            *          SAND            *
    DAYS            POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
   16.00           199.070* 50197.55                   * 11584.05                    *  2698.79                    *
                   199.070*  2106.31                   *   583.29                    *   271.78                    *
        TOTAL=     178.610* 52303.87 52303.79      0.00* 12167.34 12167.32      0.00* 2970.57  2845.96      0.04*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2085

EVENT     17 =    15.999990 DAYS TO    17.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *          CLAY            *          SILT            *          SAND            *
    DAYS            POINT *   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*   INFLOW  OUTFLOW  TRAP EFF*
   17.00           199.070* 54028.49                   * 12468.11                    *  2904.75                    *
                   199.070*  2109.53                   *   584.18                    *   272.20                    *
```

```
        TOTAL=      178.610*  56138.01  56138.01      0.00*  13052.29  13052.28      0.00*   3176.95   3049.66      0.04*
                            *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2224

EVENT     18 =    17.000013 DAYS TO    18.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                            *                                *                                *                                *
    TIME             ENTRY *            CLAY                *            SILT                *            SAND                *
    DAYS             POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   18.00            199.070*  56521.54                    *  13043.43                    *   3038.79                    *
                    199.070*   2135.09                    *    591.26                    *    275.49                    *
        TOTAL=      178.610*  58656.63  58656.52      0.00*  13634.69  13634.66      0.00*   3314.28   3199.52      0.03*
                            *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2333

EVENT     19 =    17.999998 DAYS TO    19.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                            *                                *                                *                                *
    TIME             ENTRY *            CLAY                *            SILT                *            SAND                *
    DAYS             POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   19.00            199.070*  57044.10                    *  13164.02                    *   3066.88                    *
                    199.070*   2244.63                    *    621.59                    *    289.63                    *
        TOTAL=      178.610*  59288.73  59288.66      0.00*  13785.62  13785.60      0.00*   3356.51   3239.56      0.03*
                            *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2766
EVENT     20 =    18.999983 DAYS TO    20.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                            *                                *                                *                                *
    TIME             ENTRY *            CLAY                *            SILT                *            SAND                *
    DAYS             POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   20.00            199.070*  59101.77                    *  13638.87                    *   3177.51                    *
                    199.070*   2244.69                    *    621.61                    *    289.64                    *
        TOTAL=      178.610*  61346.46  61346.33      0.00*  14260.48  14260.45      0.00*   3467.15   3345.36      0.04*
                            *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2442

EVENT     21 =    20.000006 DAYS TO    21.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.6384| 810.6134| 816.4538|
                AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT           21 WSP         401
```

```
TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*
   21.00           199.070* 60290.50                   * 13913.20                   *  3241.42                   *
                   199.070*  2245.27                   *   621.77                   *   289.71                   *
        TOTAL=     178.610* 62535.77 62535.68     0.00* 14534.97 14534.94     0.00*  3531.13  3410.62     0.03*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2634

EVENT     22 =    20.999990 DAYS TO    22.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*
   22.00           199.070* 61882.79                   * 14280.65                   *  3327.02                   *
                   199.070*  2246.06                   *   621.99                   *   289.81                   *
        TOTAL=     178.610* 64128.85 64128.70     0.00* 14902.63 14902.62     0.00*  3616.84  3497.60     0.03*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2524

EVENT     23 =    22.000013 DAYS TO    23.000000 DAYS IN    20 COMPUTATION STEPS.
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT    23 QW=   140100.0 SEGMENT   1 ASN= 180.06
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT    23 QW=   140100.0 SEGMENT   1 ASN= 180.06


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*
   23.00           199.070* 78204.67                   * 18047.23                   *  4204.54                   *
                   199.070*  2246.08                   *   621.99                   *   289.82                   *
        TOTAL=     178.610* 80450.75 80450.59     0.00* 18669.23 18669.21     0.00*  4494.36  4220.36     0.06*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1776

EVENT     24 =    22.999998 DAYS TO    24.000000 DAYS IN    20 COMPUTATION STEPS.
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT    24 QW=    99100.0 SEGMENT   1 ASN= 194.09


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*   INFLOW   OUTFLOW  TRAP EFF*
   24.00           199.070* 86113.09                   * 19872.25                   *  4629.73                   *
                   199.070*  2246.09                   *   622.00                   *   289.82                   *
        TOTAL=     178.610* 88359.19 88359.01     0.00* 20494.25 20494.22     0.00*  4919.54  4586.27     0.07*
                          *                          *                          *                          *
*****************************************************************************************************************
```

```
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1973

EVENT     25 =    23.999983 DAYS TO    25.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME             ENTRY *             CLAY               *             SILT               *             SAND               *
    DAYS             POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
   25.00            199.070*  91862.59                     *  21199.06                     *   4938.84                     *
                    199.070*   2246.23                     *    622.04                     *    289.84                     *
        TOTAL=      178.610*  94108.82  94108.63      0.00*  21821.10  21821.06      0.00*   5228.68   4870.19      0.07*
                          *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2067

EVENT     26 =    25.000006 DAYS TO    26.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.5723| 810.5510| 816.3914|
                 AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT          26 WSP        501


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME             ENTRY *             CLAY               *             SILT               *             SAND               *
    DAYS             POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
   26.00            199.070*  98493.38                     *  22729.24                     *   5295.33                     *
                    199.070*   2246.63                     *    622.15                     *    289.89                     *
        TOTAL=      178.610* 100740.02 100739.78      0.00*  23351.39  23351.36      0.00*   5585.22   5213.78      0.07*
                          *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2017

EVENT     27 =    25.999990 DAYS TO    27.000000 DAYS IN    20 COMPUTATION STEPS.
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT    27 QW=    97500.0 SEGMENT   1 ASN= 194.09
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT    27 QW=    97500.0 SEGMENT   1 ASN= 194.09


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME             ENTRY *             CLAY               *             SILT               *             SAND               *
    DAYS             POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
   27.00            199.070* 106071.40                     *  24478.02                     *   5702.76                     *
                    199.070*   2247.03                     *    622.26                     *    289.94                     *
        TOTAL=      178.610* 108318.43 108318.14      0.00*  25100.27  25100.25      0.00*   5992.70   5601.12      0.07*
                          *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1974

EVENT     28 =    27.000013 DAYS TO    28.000000 DAYS IN    20 COMPUTATION STEPS.
```

```
TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME                ENTRY *              CLAY          *              SILT              *              SAND              *
    DAYS                POINT *    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*
   28.00               199.070* 113167.33                    *  26115.54                    *   6084.26                    *
                       199.070*   2247.43                    *    622.37                    *    289.99                    *
        TOTAL=         178.610* 115414.76 115414.56      0.00*  26737.91  26737.88      0.00*   6374.25   5961.29      0.06*
                          *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1993

EVENT     29 =    27.999998 DAYS TO    29.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME                ENTRY *              CLAY          *              SILT              *              SAND              *
    DAYS                POINT *    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*
   29.00               199.070* 124382.27                    *  28703.60                    *   6687.21                    *
                       199.070*   2247.82                    *    622.48                    *    290.04                    *
        TOTAL=         178.610* 126630.09 126629.74      0.00*  29326.08  29326.06      0.00*   6977.25   6516.39      0.07*
                          *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1855

EVENT     30 =    28.999983 DAYS TO    30.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME                ENTRY *              CLAY          *              SILT              *              SAND              *
    DAYS                POINT *    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*
   30.00               199.070* 129991.32                    *  29998.00                    *   6988.77                    *
                       199.070*   2248.22                    *    622.59                    *    290.09                    *
        TOTAL=         178.610* 132239.55 132239.05      0.00*  30620.59  30620.57      0.00*   7278.86   6787.26      0.07*
                          *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2062

EVENT     31 =    30.000006 DAYS TO    31.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.5106| 810.0995| 815.9399|
                 AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT           31 WSP         601


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME                ENTRY *              CLAY          *              SILT              *              SAND              *
    DAYS                POINT *    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*
   31.00               199.070* 132766.72                    *  30638.47                    *   7137.98                    *
                       199.070*   2248.24                    *    622.59                    *    290.09                    *
        TOTAL=         178.610* 135014.95 135014.44      0.00*  31261.07  31261.05      0.00*   7428.07   6917.77      0.07*
                          *                                *                                *                                *
*****************************************************************************************************************
```

```
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2300

EVENT     32 =    30.999990 DAYS TO    32.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   32.00           199.070* 135942.97                  *  31371.46                  *   7308.75                  *
                   199.070*   2248.25                  *    622.60                  *    290.10                  *
        TOTAL=     178.610* 138191.22 138190.69   0.00*  31994.05  31994.03   0.00*   7598.84  7076.78    0.07*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2251

EVENT     33 =    32.000011 DAYS TO    33.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   33.00           199.070* 136842.14                  *  31578.96                  *   7357.09                  *
                   199.070*   2248.27                  *    622.60                  *    290.10                  *
        TOTAL=     178.610* 139090.41 139089.86   0.00*  32201.56  32201.53   0.00*   7647.19  7121.07    0.07*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2717

EVENT     34 =    32.999996 DAYS TO    34.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   34.00           199.070* 137969.53                  *  31839.13                  *   7417.71                  *
                   199.070*   2254.88                  *    624.43                  *    290.95                  *
        TOTAL=     178.610* 140224.41 140223.88   0.00*  32463.56  32463.56   0.00*   7708.66  7177.02    0.07*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2584

EVENT     35 =    33.999981 DAYS TO    35.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
```

```
*
                          *                          *                          *                          *
   TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
   DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
  35.00           199.070* 139158.39                  *  32113.48                  *   7481.62                  *
                  199.070*   2261.48                  *    626.26                  *    291.80                  *
       TOTAL=     178.610* 141419.88 141419.34   0.00*  32739.74  32739.72   0.00*   7773.42   7237.51    0.07*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2561

EVENT     36 =    34.999966 DAYS TO    36.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
   TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
   DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
  36.00           199.070* 140112.17                  *  32333.58                  *   7532.89                  *
                  199.070*   6049.00                  *   1675.11                  *    780.52                  *
       TOTAL=     178.610* 146161.17 146160.56   0.00*  34008.69  34008.69   0.00*   8313.40   7510.94    0.10*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2069

EVENT     37 =    36.000027 DAYS TO    37.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
   TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
   DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
  37.00           199.070* 140634.73                  *  32454.17                  *   7560.98                  *
                  199.070*   8354.14                  *   2313.46                  *   1077.95                  *
       TOTAL=     178.610* 148988.88 148988.36   0.00*  34767.63  34767.61   0.00*   8638.93   7705.29    0.11*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2250

EVENT     38 =    37.000011 DAYS TO    38.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
   TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
   DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
  38.00           199.070* 140787.53                  *  32489.43                  *   7569.20                  *
                  199.070*   9204.26                  *   2548.88                  *   1187.65                  *
       TOTAL=     178.610* 149991.80 149991.36   0.00*  35038.31  35038.29   0.00*   8756.84   7764.67    0.11*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2659
```

```
EVENT     39 =    37.999996 DAYS TO    39.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME             ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS             POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   39.00            199.070* 155220.09                   *  35820.02                    *   8345.14                    *
                    199.070*   9204.28                   *   2548.88                    *   1187.65                    *
        TOTAL=      178.610* 164424.38 164423.92      0.00*  38368.91  38368.88      0.00*   9532.79   8529.54      0.11*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1762

EVENT     40 =    38.999981 DAYS TO    40.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME             ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS             POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   40.00            199.070* 157995.48                   *  36460.50                    *   8494.36                    *
                    199.070*   9205.30                   *   2549.17                    *   1187.78                    *
        TOTAL=      178.610* 167200.78 167200.30      0.00*  39009.67  39009.64      0.00*   9682.14   8664.53      0.11*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2267

EVENT     41 =    39.999966 DAYS TO    41.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.5518| 810.4847| 816.3251|
                AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT           41 WSP         801


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME             ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS             POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   41.00            199.070* 162799.41                   *  37569.09                    *   8752.63                    *
                    199.070*   9414.12                   *   2607.00                    *   1214.73                    *
        TOTAL=      178.610* 172213.53 172213.09      0.00*  40176.09  40176.04      0.00*   9967.36   8957.79      0.10*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1999

EVENT     42 =    41.000027 DAYS TO    42.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME             ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS             POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   42.00            199.070* 166186.73                   *  38350.79                    *   8934.75                    *
```

```
                 199.070*   9523.67                    *   2637.33                    *   1228.86                    *
        TOTAL=   178.610* 175710.41 175709.88      0.00*  40988.12  40988.08      0.00*  10163.61   9147.32      0.10*
                         *                            *                            *                               *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2125

EVENT     43 =    42.000011 DAYS TO    43.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                         *                            *                            *                               *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND               *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   43.00            199.070* 167569.53                   *  38669.89                    *   9009.10                    *
                    199.070*  10155.38                   *   2812.27                    *   1310.37                    *
        TOTAL=      178.610* 177724.91 177724.45      0.00*  41482.16  41482.14      0.00*  10319.47   9264.60      0.10*
                         *                            *                            *                               *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2250

EVENT     44 =    42.999996 DAYS TO    44.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                         *                            *                            *                               *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND               *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   44.00            199.070* 171751.72                   *  39635.01                    *   9233.95                    *
                    199.070*  10327.52                   *   2859.94                    *   1332.58                    *
        TOTAL=      178.610* 182079.25 182078.78      0.00*  42494.95  42494.95      0.00*  10566.53   9507.44      0.10*
                         *                            *                            *                               *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2046

EVENT     45 =    43.999981 DAYS TO    45.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                         *                            *                            *                               *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND               *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   45.00            199.070* 175139.30                   *  40416.76                    *   9416.07                    *
                    199.070*  10620.41                   *   2941.05                    *   1370.38                    *
        TOTAL=      178.610* 185759.70 185759.22      0.00*  43357.81  43357.79      0.00*  10786.45   9708.65      0.10*
                         *                            *                            *                               *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2078

EVENT     46 =    44.999966 DAYS TO    46.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.4688| 810.4752| 816.3156|
                AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT          46 WSP         901
```

```
TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *           CLAY           *           SILT           *           SAND           *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   46.00           199.070* 178970.33                  *  41300.85                  *   9622.04                  *
                   199.070*  11252.15                  *   3115.99                  *   1451.89                  *
        TOTAL=     178.610* 190222.48 190222.03   0.00*  44416.84  44416.83   0.00*  11073.93   9967.64   0.10*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1995

EVENT     47 =    46.000027 DAYS TO    47.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *           CLAY           *           SILT           *           SAND           *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   47.00           199.070* 181649.73                  *  41919.17                  *   9766.09                  *
                   199.070*  11643.50                  *   3224.37                  *   1502.39                  *
        TOTAL=     178.610* 193293.23 193292.73   0.00*  45143.54  45143.54   0.00*  11268.48  10129.15   0.10*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2122

EVENT     48 =    47.000011 DAYS TO    48.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *           CLAY           *           SILT           *           SAND           *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   48.00           199.070* 186714.44                  *  43087.95                  *  10038.39                  *
                   199.070*  11892.55                  *   3293.34                  *   1534.52                  *
        TOTAL=     178.610* 198606.98 198606.48   0.00*  46381.29  46381.31   0.00*  11572.91  10409.14   0.10*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1971

EVENT     49 =    47.999996 DAYS TO    49.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *           CLAY           *           SILT           *           SAND           *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   49.00           199.070* 193345.34                  *  44618.16                  *  10394.89                  *
                   199.070*  12141.61                  *   3362.31                  *   1566.66                  *
        TOTAL=     178.610* 205486.95 205486.44   0.00*  47980.47  47980.49   0.00*  11961.54  10752.17   0.10*
                          *                          *                          *                          *
*****************************************************************************************************************
*
```

```
EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1897

EVENT     50 =    48.999981 DAYS TO    50.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   50.00           199.070* 195162.55                   *  45037.51                   *  10492.59                   *
                   199.070*  13243.01                   *   3667.32                   *   1708.77                   *
        TOTAL=     178.610* 208405.56 208404.83    0.00*  48704.83  48704.82    0.00*  12201.36  10896.59    0.11*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2121

EVENT     51 =    49.999966 DAYS TO    51.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.4127| 810.5191| 816.3595|
                 AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT          51 WSP        1001


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   51.00           199.070* 197058.11                   *  45474.95                   *  10594.51                   *
                   199.070*  16546.93                   *   4582.24                   *   2135.08                   *
        TOTAL=     178.610* 213605.05 213604.47    0.00*  50057.19  50057.20    0.00*  12729.60  11201.73    0.12*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1962

EVENT     52 =    51.000027 DAYS TO    52.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   52.00           199.070* 199115.53                   *  45949.74                   *  10705.13                   *
                   199.070*  19696.86                   *   5454.53                   *   2541.53                   *
        TOTAL=     178.610* 218812.39 218811.94    0.00*  51404.27  51404.26    0.00*  13246.65  11516.24    0.13*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1954

EVENT     53 =    52.000011 DAYS TO    53.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
```

```
            (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   53.00           199.070* 200856.09                   *  46351.41                   *  10798.70                   *
                   199.070*  21082.44                   *   5838.23                   *   2720.31                   *
        TOTAL=     178.610* 221938.53 221937.98    0.00*  52189.64  52189.63    0.00*  13519.02  11702.33    0.13*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2099

EVENT     54 =    52.999996 DAYS TO    54.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
            (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   54.00           199.070* 202172.53                   *  46655.20                   *  10869.48                   *
                   199.070*  21783.33                   *   6032.32                   *   2810.75                   *
        TOTAL=     178.610* 223955.86 223955.25    0.00*  52687.52  52687.47    0.00*  13680.22  11826.72    0.14*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2241

EVENT     55 =    53.999981 DAYS TO    55.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
            (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   55.00           199.070* 203182.39                   *  46888.25                   *  10923.78                   *
                   199.070*  22174.70                   *   6140.71                   *   2861.25                   *
        TOTAL=     178.610* 225357.09 225356.41    0.00*  53028.95  53028.90    0.00*  13785.03  11905.79    0.14*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2372

EVENT     56 =    54.999966 DAYS TO    56.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.3932| 810.5452| 816.3856|
                AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT           56 WSP        1101


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
            (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   56.00           199.070* 206569.95                   *  47669.99                   *  11105.91                   *
                   199.070*  22235.85                   *   6157.65                   *   2869.14                   *
        TOTAL=     178.610* 228805.81 228805.20    0.00*  53827.64  53827.60    0.00*  13975.05  12092.58    0.13*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
```

```
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2133

EVENT     57 =    56.000027 DAYS TO    57.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   57.00           199.070* 208235.58                  *  48054.37                  *  11195.44                  *
                   199.070*  22319.45                  *   6180.79                  *   2879.93                  *
        TOTAL=     178.610* 230555.03 230554.08    0.00*  54235.16  54235.03    0.00*  14075.37  12192.17    0.13*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2341

EVENT     58 =    57.000011 DAYS TO    58.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   58.00           199.070* 209552.02                  *  48358.16                  *  11266.21                  *
                   199.070*  22429.00                  *   6211.12                  *   2894.06                  *
        TOTAL=     178.610* 231981.02 231980.22    0.00*  54569.28  54569.11    0.00*  14160.27  12272.98    0.13*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2397

EVENT     59 =    57.999996 DAYS TO    59.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   59.00           199.070* 210868.45                  *  48661.95                  *  11336.98                  *
                   199.070*  22538.54                  *   6241.45                  *   2908.20                  *
        TOTAL=     178.610* 233407.00 233406.36    0.00*  54903.40  54903.20    0.00*  14245.18  12352.43    0.13*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2397

EVENT     60 =    58.999981 DAYS TO    60.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
```

```
    DAYS            POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
   60.00           199.070* 212609.00                    *  49063.62                    *  11430.56                    *
                   199.070*  22677.60                    *   6279.96                    *   2926.14                    *
        TOTAL=     178.610* 235286.59 235286.00      0.00*  55343.58  55343.40      0.00*  14356.71  12459.15      0.13*
                          *                              *                              *                              *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2301

EVENT     61 =    59.999966 DAYS TO    61.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.3904| 810.5404| 816.3808|
                 AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT          61 WSP        1201


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                              *                              *                              *
    TIME            ENTRY *            CLAY              *            SILT              *            SAND              *
    DAYS            POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
   61.00           199.070* 213508.17                    *  49271.12                    *  11478.89                    *
                   199.070*  22816.66                    *   6318.47                    *   2944.09                    *
        TOTAL=     178.610* 236324.83 236324.27      0.00*  55589.59  55589.45      0.00*  14422.98  12507.11      0.13*
                          *                              *                              *                              *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2496

EVENT     62 =    61.000027 DAYS TO    62.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                              *                              *                              *
    TIME            ENTRY *            CLAY              *            SILT              *            SAND              *
    DAYS            POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
   62.00           199.070* 214030.73                    *  49391.71                    *  11506.99                    *
                   199.070*  22926.21                    *   6348.80                    *   2958.22                    *
        TOTAL=     178.610* 236956.94 236956.53      0.00*  55740.52  55740.32      0.00*  14465.21  12539.42      0.13*
                          *                              *                              *                              *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2683

EVENT     63 =    62.000011 DAYS TO    63.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                              *                              *                              *
    TIME            ENTRY *            CLAY              *            SILT              *            SAND              *
    DAYS            POINT *    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*    INFLOW   OUTFLOW  TRAP EFF*
   63.00           199.070* 216006.38                    *  49847.63                    *  11613.20                    *
                   199.070*  22926.21                    *   6348.80                    *   2958.22                    *
        TOTAL=     178.610* 238932.58 238932.17      0.00*  56196.43  56196.24      0.00*  14571.43  12633.79      0.13*
                          *                              *                              *                              *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2380
```

```
EVENT     64 =    62.999996 DAYS TO    64.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   64.00           199.070* 216703.77                   *  50008.57                   *  11650.70                   *
                   199.070*  23065.27                   *   6387.31                   *   2976.17                   *
        TOTAL=     178.610* 239769.03 239768.66    0.00*  56395.88  56395.71    0.00*  14626.87  12674.73    0.13*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2572

EVENT     65 =    63.999981 DAYS TO    65.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   65.00           199.070* 236626.14                   *  54606.04                   *  12721.80                   *
                   199.070*  26852.72                   *   7436.15                   *   3464.87                   *
        TOTAL=     178.610* 263478.88 263478.22    0.00*  62042.19  62042.00    0.00*  16186.67  13591.09    0.16*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1538

EVENT     66 =    65.000038 DAYS TO    66.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|********|********| 816.4006| 810.4403| 816.2807|
                AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
NDSM          1 EVENT          66 WSP        1301


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   66.00           199.070* 249938.42                   *  57678.10                   *  13437.51                   *
                   199.070*  29424.62                   *   8148.38                   *   3796.73                   *
        TOTAL=     178.610* 279363.03 279362.66    0.00*  65826.48  65826.30    0.00*  17234.24  14295.81    0.17*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1619

EVENT     67 =    65.999947 DAYS TO    67.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   67.00           199.070* 259425.30                   *  59867.38                   *  13947.57                   *
```

```
                 199.070*  31240.66                    *   8651.28                    *   4031.06                    *
      TOTAL=     178.610* 290665.97 290665.50      0.00*  68518.66  68518.51      0.00*  17978.63  14852.95      0.17*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1700

EVENT     68 =    67.000008 DAYS TO    68.000000 DAYS IN    20 COMPUTATION STEPS.
NEWGR: ZONE 2 DEPOSIT>WS.=ERR NEVNT    68 QW=   120000.0 SEGMENT   1 ASN= 194.09


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   68.00            199.070* 266209.25                   *  61432.91                    *  14312.31                    *
                    199.070*  32626.21                   *   9034.98                    *   4209.84                    *
      TOTAL=        178.610* 298835.47 298834.94      0.00*  70467.88  70467.73      0.00*  18522.15  15263.84      0.18*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1787

EVENT     69 =    68.000069 DAYS TO    69.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   69.00            199.070* 271142.47                   *  62571.34                    *  14577.52                    *
                    199.070*  33640.11                   *   9315.76                    *   4340.67                    *
      TOTAL=        178.610* 304782.56 304781.94      0.00*  71887.10  71886.91      0.00*  18918.20  15568.84      0.18*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1879

EVENT     70 =    68.999977 DAYS TO    70.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                            *                            *                            *
    TIME            ENTRY *            CLAY            *            SILT            *            SAND            *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   70.00            199.070* 274860.13                   *  63429.26                    *  14777.40                    *
                    199.070*  34413.79                   *   9530.01                    *   4440.50                    *
      TOTAL=        178.610* 309273.91 309272.91      0.00*  72959.27  72959.00      0.00*  19217.90  15805.75      0.18*
                          *                            *                            *                            *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.1967

EVENT     71 =    70.000038 DAYS TO    71.000000 DAYS IN    20 COMPUTATION STEPS.
NEG| 34   0.3299|*********|*********| 816.3791| 810.4763| 816.3167|
                AFTER            1 ITERATIONS. ASN = 179.50 IDSM          1
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NDSM          1 EVENT          71 WSP        1401


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   71.00           199.070* 277732.97                  *  64092.23                  *  14931.85                  *
                   199.070*  34979.93                  *   9686.80                  *   4513.56                  *
        TOTAL=     178.610* 312712.91 312711.91    0.00*  73779.03  73778.72    0.00*  19445.41  15979.00    0.18*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2058

EVENT     72 =    70.999947 DAYS TO    72.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   72.00           199.070* 279790.88                  *  64567.13                  *  15042.49                  *
                   199.070*  35425.97                  *   9810.31                  *   4571.11                  *
        TOTAL=     178.610* 315216.84 315215.50    0.00*  74377.45  74377.04    0.00*  19613.60  16108.59    0.18*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2165

EVENT     73 =    72.000008 DAYS TO    73.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   73.00           199.070* 281311.56                  *  64918.05                  *  15124.24                  *
                   199.070*  35718.84                  *   9891.42                  *   4608.90                  *
        TOTAL=     178.610* 317030.41 317029.00    0.00*  74809.47  74809.11    0.00*  19733.15  16202.88    0.18*
                          *                          *                          *                          *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2281

EVENT     74 =    73.000069 DAYS TO    74.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                          *                          *                          *
    TIME            ENTRY *            CLAY          *            SILT          *            SAND          *
    DAYS            POINT *    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*    INFLOW  OUTFLOW  TRAP EFF*
   74.00           199.070* 282379.19                  *  65164.43                  *  15181.66                  *
                   199.070*  35927.65                  *   9949.24                  *   4635.84                  *
        TOTAL=     178.610* 318306.84 318305.78    0.00*  75113.67  75113.35    0.00*  19817.50  16263.11    0.18*
                          *                          *                          *                          *
*****************************************************************************************************************
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*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2408

EVENT     75 =    73.999977 DAYS TO    75.000000 DAYS IN    20 COMPUTATION STEPS.


TABLE SA-1.  Rio Watercourse Master Plan 82000240
        ACCUMULATED ACRE-FEET ENTERING AND LEAVING SEGMENT #  1
             (Multiply by 1233.48 to get Cubic Meters)
*****************************************************************************************************************
*
                          *                                *                                *                                *
    TIME                ENTRY *              CLAY              *              SILT              *              SAND              *
    DAYS                POINT *    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*    INFLOW    OUTFLOW  TRAP EFF*
   75.00               199.070* 283076.59                     *  65325.37                     *  15219.16                     *
                       199.070*  36066.74                     *   9987.75                     *   4653.79                     *
        TOTAL=         178.610* 319143.34 319142.28      0.00*  75313.13  75312.83      0.00*  19872.94  16294.43      0.18*
                          *                                *                                *                                *
*****************************************************************************************************************
*

EVENT DURATION(DAYS) = 0.5000E-01
RESIDENT TIME BY SEGMENT.
 SEGMENT
 NUMBER  TIME(DAYS)

    1    0.2568


 $VOL  A
1


 SEGMENT #   1:   Rio Watercourse Master Plan 82000240

 TABLE VOL-1.  SEDIMENT DELIVERY AND BED ACCUMULATION AFTER  75.0000      DAYS.
```

	SECTION	SEDIMENT PASSING SECTION IN TONS				SEDIMENT DEPOSITED IN REACH IN CUBIC YARDS				
		TOTAL	SAND	SILT	CLAY	TOTAL	ACCUMULATED	SAND	SILT	CLAY
0	INFLOW	308270368.	30827008.	92481128.	184962240.	586642048.				
	199.070	307363520.	29920152.	92481128.	184962240.	722323.	722323.	722307.	1.	15.
0	LOCAL	47132100.	9426433.	14139660.	23566006.	81809352.				
	198.960	353486624.	38338696.	106620376.	208527552.	804990.	1527313.	802778.	472.	1740.
	198.860	352909312.	37761400.	106620376.	208527552.	459826.	1987139.	459813.	0.	12.
	198.790	352557920.	37409984.	106620376.	208527552.	279913.	2267052.	279901.	0.	12.
	198.730	352198048.	37050124.	106620376.	208527552.	286640.	2553692.	286627.	0.	12.
	198.650	351900512.	36752576.	106620376.	208527552.	237008.	2790700.	236995.	0.	12.
	198.590	351613984.	36466052.	106620376.	208527552.	228227.	3018926.	228214.	0.	12.
	198.490	351374784.	36226856.	106620376.	208527552.	190531.	3209457.	190519.	0.	12.
	198.400	351363200.	36215276.	106620376.	208527552.	9237.	3218694.	9224.	0.	12.
	198.340	351391104.	36243180.	106620376.	208527552.	-22213.	3196481.	-22225.	0.	12.
	198.300	351277184.	36129256.	106620376.	208527552.	90753.	3287234.	90741.	0.	12.
	198.260	351286240.	36138320.	106620376.	208527552.	-7206.	3280027.	-7219.	0.	12.
	198.200	351359232.	36211288.	106620376.	208527552.	-58107.	3221920.	-58120.	0.	12.
	198.110	351460512.	36312576.	106620376.	208527552.	-80663.	3141258.	-80675.	0.	12.
	198.020	351565376.	36417432.	106620376.	208527552.	-83506.	3057752.	-83518.	0.	12.
	197.920	351552480.	36404564.	106620376.	208527552.	10261.	3068013.	10249.	0.	12.
	197.830	351446656.	36298744.	106620376.	208527552.	84297.	3152310.	84284.	0.	12.
	197.740	351446656.	36298728.	106620376.	208527552.	25.	3152335.	13.	0.	12.
	197.640	351044992.	35897060.	106620376.	208527552.	319940.	3472275.	319928.	0.	12.
	197.540	350983904.	35835964.	106620376.	208527552.	48675.	3520950.	48662.	0.	12.
	197.450	350908896.	35760956.	106620376.	208527552.	59756.	3580706.	59744.	0.	12.
	197.350	350897600.	35749672.	106620376.	208527552.	9000.	3589706.	8987.	0.	12.
	197.260	350839680.	35691756.	106620376.	208527552.	46142.	3635848.	46129.	0.	12.
	197.160	350323328.	35175384.	106620376.	208527552.	411300.	4047148.	411287.	0.	12.
	197.070	350204576.	35056644.	106620376.	208527552.	94588.	4141735.	94575.	0.	12.
	196.980	350203392.	35055464.	106620376.	208527552.	951.	4142687.	939.	0.	12.
	196.880	350255168.	35107232.	106620376.	208527552.	-41220.	4101467.	-41232.	0.	12.
	196.790	350212384.	35064460.	106620376.	208527552.	34080.	4135548.	34068.	0.	12.
	196.700	350135392.	34987464.	106620376.	208527552.	61339.	4196887.	61327.	0.	12.
	196.610	350053280.	34905340.	106620376.	208527552.	65424.	4262311.	65412.	0.	12.
	196.510	349959776.	34811836.	106620376.	208527552.	74488.	4336799.	74476.	0.	12.
	196.420	349888032.	34740112.	106620376.	208527552.	57140.	4393939.	57127.	0.	12.
	196.320	349800800.	34652880.	106620376.	208527552.	69492.	4463431.	69479.	0.	12.
	196.230	349732576.	34584636.	106620376.	208527552.	54368.	4517798.	54355.	0.	12.
	196.130	349546016.	34398080.	106620376.	208527552.	148603.	4666401.	148590.	0.	12.
	196.040	349442624.	34294684.	106620376.	208527552.	82367.	4748768.	82355.	0.	12.
	195.940	349437536.	34289620.	106620376.	208527552.	4047.	4752814.	4034.	0.	12.
	195.850	349446176.	34298236.	106620376.	208527552.	-6850.	4745964.	-6862.	0.	12.
	195.750	349487520.	34339592.	106620376.	208527552.	-32928.	4713036.	-32940.	0.	12.
	195.660	349480512.	34332584.	106620376.	208527552.	5594.	4718630.	5582.	0.	12.
	195.560	349467136.	34319192.	106620376.	208527552.	10679.	4729309.	10666.	0.	12.
	195.470	349501824.	34353888.	106620376.	208527552.	-27623.	4701686.	-27635.	0.	12.
	195.380	349538176.	34390264.	106620376.	208527552.	-28960.	4672726.	-28972.	0.	12.

195.280	349556032.	34408120.	106620376.	208527552.	-14210.	4658516.	-14223.	0.	12.
195.190	349538016.	34390100.	106620376.	208527552.	14365.	4672881.	14352.	0.	12.
195.160	349538112.	34390172.	106620376.	208527552.	-45.	4672837.	-57.	0.	12.
195.090	349554464.	34406540.	106620376.	208527552.	-13024.	4659813.	-13036.	0.	12.
195.000	349556704.	34408772.	106620376.	208527552.	-1765.	4658048.	-1778.	0.	12.
194.910	349553312.	34405396.	106620376.	208527552.	2702.	4660749.	2689.	0.	12.
194.810	349441344.	34293416.	106620376.	208527552.	89203.	4749952.	89191.	0.	12.
194.720	349385696.	34237760.	106620376.	208527552.	44343.	4794295.	44330.	0.	12.
194.620	349353408.	34205468.	106620376.	208527552.	25733.	4820029.	25721.	0.	12.
194.530	349315168.	34167232.	106620376.	208527552.	30468.	4850497.	30456.	0.	12.
194.400	349313408.	34165492.	106620376.	208527552.	1398.	4851895.	1386.	0.	12.
194.290	349377760.	34229828.	106620376.	208527552.	-51231.	4800663.	-51244.	0.	12.
194.210	349294592.	34146656.	106620376.	208527552.	66259.	4866922.	66246.	0.	12.
194.090	349170880.	34022968.	106620376.	208527552.	98530.	4965452.	98517.	0.	12.
194.010	349070144.	33922220.	106620376.	208527552.	80257.	5045709.	80245.	0.	12.
193.930	348953472.	33805544.	106620376.	208527552.	92945.	5138654.	92932.	0.	12.
193.860	348817824.	33669892.	106620376.	208527552.	108059.	5246713.	108047.	0.	12.
193.780	348698048.	33550114.	106620376.	208527552.	95416.	5342128.	95403.	0.	12.
193.710	348619264.	33471326.	106620376.	208527552.	62766.	5404894.	62754.	0.	12.
193.650	348525216.	33377302.	106620376.	208527552.	74902.	5479796.	74889.	0.	12.
193.540	348457984.	33310044.	106620376.	208527552.	53582.	5533378.	53570.	0.	12.
193.450	348389920.	33241988.	106620376.	208527552.	54219.	5587597.	54206.	0.	12.
193.360	348345856.	33197940.	106620376.	208527552.	35097.	5622693.	35084.	0.	12.
193.240	348287904.	33139976.	106620376.	208527552.	46181.	5668874.	46168.	0.	12.
193.160	348285920.	33137986.	106620376.	208527552.	1598.	5670472.	1585.	0.	12.
193.070	348268672.	33120754.	106620376.	208527552.	13737.	5684209.	13725.	0.	12.
192.970	348261952.	33114020.	106620376.	208527552.	5377.	5689585.	5364.	0.	12.
192.880	348276608.	33128680.	106620376.	208527552.	-11664.	5677921.	-11677.	0.	12.
192.780	348276448.	33128512.	106620376.	208527552.	146.	5678067.	133.	0.	12.
192.690	348269120.	33121194.	106620376.	208527552.	5841.	5683908.	5828.	0.	12.
192.600	348260352.	33112408.	106620376.	208527552.	7011.	5690918.	6998.	0.	12.
192.510	348220480.	33072560.	106620376.	208527552.	31751.	5722670.	31739.	0.	12.
192.420	348210112.	33062182.	106620376.	208527552.	8279.	5730949.	8267.	0.	12.
192.330	348207936.	33060004.	106620376.	208527552.	1748.	5732697.	1736.	0.	12.
192.230	348091872.	32943950.	106620376.	208527552.	92449.	5825146.	92436.	0.	12.
192.130	348030336.	32882398.	106620376.	208527552.	49038.	5874184.	49026.	0.	12.
192.040	347929600.	32781680.	106620376.	208527552.	80234.	5954418.	80221.	0.	12.
191.940	347762176.	32614244.	106620376.	208527552.	133374.	6087792.	133361.	0.	12.
191.840	347598560.	32450622.	106620376.	208527552.	130336.	6218128.	130324.	0.	12.
191.750	347439040.	32291102.	106620376.	208527552.	127069.	6345197.	127057.	0.	12.
191.650	347326976.	32179044.	106620376.	208527552.	89267.	6434464.	89254.	0.	12.
191.550	347221984.	32074048.	106620376.	208527552.	83641.	6518105.	83629.	0.	12.
191.460	347121632.	31973712.	106620376.	208527552.	79929.	6598034.	79916.	0.	12.
191.360	347064096.	31916168.	106620376.	208527552.	45846.	6643880.	45834.	0.	12.
191.270	347014304.	31866366.	106620376.	208527552.	39679.	6683559.	39667.	0.	12.
191.170	346969824.	31821908.	106620376.	208527552.	35424.	6718983.	35411.	0.	12.
191.080	346912768.	31764856.	106620376.	208527552.	45453.	6764436.	45441.	0.	12.
190.990	346883712.	31735768.	106620376.	208527552.	23180.	6787616.	23167.	0.	12.
190.890	346865984.	31718054.	106620376.	208527552.	14121.	6801737.	14109.	0.	12.
190.800	346882432.	31734502.	106620376.	208527552.	-13088.	6788650.	-13100.	0.	12.
190.710	346900576.	31752634.	106620376.	208527552.	-14430.	6774220.	-14442.	0.	12.
190.620	346911552.	31763612.	106620376.	208527552.	-8732.	6765488.	-8744.	0.	12.
190.530	346920832.	31772902.	106620376.	208527552.	-7387.	6758101.	-7400.	0.	12.
190.430	346952320.	31804382.	106620376.	208527552.	-25061.	6733040.	-25073.	0.	12.
190.340	346978048.	31830136.	106620376.	208527552.	-20500.	6712540.	-20512.	0.	12.
190.240	346982432.	31834492.	106620376.	208527552.	-3457.	6709083.	-3470.	0.	12.
190.150	347029088.	31881160.	106620376.	208527552.	-37158.	6671925.	-37171.	0.	12.
190.050	346950656.	31802738.	106620376.	208527552.	62475.	6734399.	62462.	0.	12.
189.960	346885824.	31737884.	106620376.	208527552.	51669.	6786068.	51656.	0.	12.
189.870	346793472.	31645554.	106620376.	208527552.	73553.	6859621.	73541.	0.	12.
189.770	346560480.	31412550.	106620376.	208527552.	185600.	7045220.	185587.	0.	12.
189.680	346369728.	31221806.	106620376.	208527552.	151938.	7197159.	151926.	0.	12.
189.580	346209600.	31061668.	106620376.	208527552.	127561.	7324720.	127549.	0.	12.
189.490	346020864.	30872936.	106620376.	208527552.	150336.	7475056.	150323.	0.	12.
189.390	345829664.	30681724.	106620376.	208527552.	152311.	7627367.	152299.	0.	12.
189.310	345708288.	30560354.	106620376.	208527552.	96684.	7724050.	96671.	0.	12.
189.220	345572640.	30424718.	106620376.	208527552.	108045.	7832095.	108033.	0.	12.
189.120	345391712.	30243780.	106620376.	208527552.	144129.	7976225.	144117.	0.	12.
189.020	345133184.	29985252.	106620376.	208527552.	205928.	8182153.	205915.	0.	12.
188.920	345335424.	30187510.	106620376.	208527552.	-161086.	8021067.	-161098.	0.	12.
188.810	345386656.	30238730.	106620376.	208527552.	-40784.	7980283.	-40797.	0.	12.
188.700	345598080.	30450138.	106620376.	208527552.	-168374.	7811910.	-168386.	0.	12.
188.590	345742560.	30594630.	106620376.	208527552.	-115075.	7696835.	-115087.	0.	12.
188.500	345858272.	30710348.	106620376.	208527552.	-92156.	7604679.	-92168.	0.	12.
188.390	345925888.	30777958.	106620376.	208527552.	-53839.	7550840.	-53851.	0.	12.
188.290	346030016.	30882078.	106620376.	208527552.	-82918.	7467922.	-82930.	0.	12.
188.200	346121600.	30973668.	106620376.	208527552.	-72939.	7394983.	-72951.	0.	12.
188.100	346140032.	30992088.	106620376.	208527552.	-14658.	7380324.	-14671.	0.	12.
188.070	346113632.	30965696.	106620376.	208527552.	21033.	7401357.	21020.	0.	12.
188.000	346240448.	31092522.	106620376.	208527552.	-101004.	7300353.	-101016.	0.	12.
187.910	346408768.	31260844.	106620376.	208527552.	-134055.	7166298.	-134068.	0.	12.
187.820	346580800.	31432874.	106620376.	208527552.	-137008.	7029289.	-137021.	0.	12.
187.730	346729760.	31581840.	106620376.	208527552.	-118639.	6910650.	-118652.	0.	12.
187.640	346919552.	31771638.	106620376.	208527552.	-151160.	6759490.	-151173.	0.	12.
187.540	347112064.	31964124.	106620376.	208527552.	-153303.	6606187.	-153315.	0.	12.
187.450	347283904.	32135982.	106620376.	208527552.	-136871.	6469317.	-136883.	0.	12.
187.360	347486208.	32338296.	106620376.	208527552.	-161129.	6308188.	-161141.	0.	12.
187.240	347727008.	32579092.	106620376.	208527552.	-191780.	6116408.	-191792.	0.	12.
187.150	347888416.	32740492.	106620376.	208527552.	-128542.	5987866.	-128555.	0.	12.
187.060	348039008.	32891090.	106620376.	208527552.	-119939.	5867928.	-119951.	0.	12.
186.970	348206464.	33058544.	106620376.	208527552.	-133363.	5734565.	-133376.	0.	12.
186.870	348384128.	33236212.	106620376.	208527552.	-141499.	5593066.	-141511.	0.	12.
186.780	348547040.	33399108.	106620376.	208527552.	-129733.	5463333.	-129745.	0.	12.
186.690	348676992.	33529078.	106620376.	208527552.	-103507.	5359826.	-103520.	0.	12.
186.610	348772032.	33624108.	106620376.	208527552.	-75678.	5284148.	-75691.	0.	12.

186.550	348860768.	33712848.	106620376.	208527552.	-70669.	5213479.	-70682.	0.	12.
186.460	348968192.	33820248.	106620376.	208527552.	-85531.	5127948.	-85543.	0.	12.
186.360	349098176.	33950244.	106620376.	208527552.	-103528.	5024420.	-103540.	0.	12.
186.270	349208224.	34060300.	106620376.	208527552.	-87647.	4936773.	-87660.	0.	12.
186.190	349304320.	34156376.	106620376.	208527552.	-76511.	4860262.	-76524.	0.	12.
186.100	349406784.	34258844.	106620376.	208527552.	-81602.	4778660.	-81615.	0.	12.
186.000	349392512.	34244588.	106620376.	208527552.	11366.	4790026.	11354.	0.	12.
185.900	349448064.	34300132.	106620376.	208527552.	-44228.	4745798.	-44241.	0.	12.
185.810	349578208.	34430280.	106620376.	208527552.	-103650.	4642148.	-103663.	0.	12.
185.710	349803072.	34655128.	106620376.	208527552.	-179079.	4463069.	-179091.	0.	12.
185.610	349956992.	34809048.	106620376.	208527552.	-122583.	4340485.	-122596.	0.	12.
185.530	350101056.	34953140.	106620376.	208527552.	-114756.	4225729.	-114768.	0.	12.
185.460	350243040.	35095116.	106620376.	208527552.	-113071.	4112658.	-113084.	0.	12.
185.380	350384224.	35236304.	106620376.	208527552.	-112443.	4000215.	-112455.	0.	12.
185.280	350431296.	35283360.	106620376.	208527552.	-37467.	3962748.	-37479.	0.	12.
185.190	350367520.	35219584.	106620376.	208527552.	50811.	4013559.	50798.	0.	12.
185.100	350404128.	35256200.	106620376.	208527552.	-29152.	3984407.	-29164.	0.	12.
185.000	350525536.	35377604.	106620376.	208527552.	-96686.	3887721.	-96698.	0.	12.
184.900	350568448.	35420520.	106620376.	208527552.	-34170.	3853551.	-34182.	0.	12.
184.810	350593280.	35445344.	106620376.	208527552.	-19760.	3833791.	-19773.	0.	12.
184.710	350597440.	35449504.	106620376.	208527552.	-3302.	3830489.	-3314.	0.	12.
184.620	350549568.	35401632.	106620376.	208527552.	38142.	3868631.	38130.	0.	12.
184.530	350427392.	35279480.	106620376.	208527552.	97306.	3965937.	97293.	0.	12.
184.430	350308896.	35160980.	106620376.	208527552.	94396.	4060334.	94384.	0.	12.
184.330	350248864.	35100948.	106620376.	208527552.	47828.	4108161.	47815.	0.	12.
184.240	350264640.	35116704.	106620376.	208527552.	-12538.	4095623.	-12550.	0.	12.
184.140	350286944.	35139012.	106620376.	208527552.	-17756.	4077867.	-17769.	0.	12.
184.050	350342336.	35194412.	106620376.	208527552.	-44114.	4033753.	-44126.	0.	12.
183.960	350417696.	35269772.	106620376.	208527552.	-60012.	3973741.	-60024.	0.	12.
183.860	350533536.	35385616.	106620376.	208527552.	-92257.	3881484.	-92270.	0.	12.
183.770	350507296.	35359360.	106620376.	208527552.	20926.	3902409.	20913.	0.	12.
183.670	350519584.	35371648.	106620376.	208527552.	-9776.	3892634.	-9788.	0.	12.
183.580	350521984.	35374068.	106620376.	208527552.	-1915.	3890718.	-1928.	0.	12.
183.490	350471936.	35324024.	106620376.	208527552.	39873.	3930591.	39860.	0.	12.
183.390	350181216.	35033292.	106620376.	208527552.	231579.	4162170.	231567.	0.	12.
183.300	349999616.	34851704.	106620376.	208527552.	144647.	4306818.	144635.	0.	12.
183.200	349760736.	34612808.	106620376.	208527552.	190293.	4497111.	190280.	0.	12.
183.110	349498720.	34350796.	106620376.	208527552.	208704.	4705815.	208692.	0.	12.
183.020	349320160.	34172224.	106620376.	208527552.	142244.	4848059.	142232.	0.	12.
182.920	349123104.	33975180.	106620376.	208527552.	156957.	5005015.	156944.	0.	12.
182.830	348917088.	33769148.	106620376.	208527552.	164116.	5169131.	164104.	0.	12.
182.740	348737280.	33589352.	106620376.	208527552.	143219.	5312350.	143206.	0.	12.
182.640	348585760.	33437838.	106620376.	208527552.	120693.	5433043.	120681.	0.	12.
182.550	348482336.	33334418.	106620376.	208527552.	82387.	5515430.	82374.	0.	12.
182.450	348431552.	33283612.	106620376.	208527552.	40479.	5555909.	40467.	0.	12.
182.360	348392000.	33244086.	106620376.	208527552.	31496.	5587405.	31483.	0.	12.
182.270	348349728.	33201804.	106620376.	208527552.	33689.	5621094.	33677.	0.	12.
182.170	348366592.	33218664.	106620376.	208527552.	-13416.	5607678.	-13428.	0.	12.
182.080	348373568.	33225654.	106620376.	208527552.	-5555.	5602122.	-5568.	0.	12.
181.990	348448192.	33300254.	106620376.	208527552.	-59406.	5542716.	-59418.	0.	12.
181.900	348517664.	33369722.	106620376.	208527552.	-55319.	5487397.	-55331.	0.	12.
181.820	348563360.	33415440.	106620376.	208527552.	-36401.	5450996.	-36414.	0.	12.
181.740	348625728.	33477802.	106620376.	208527552.	-49658.	5401338.	-49671.	0.	12.
181.620	348702816.	33554888.	106620376.	208527552.	-61387.	5339951.	-61399.	0.	12.
181.510	348790400.	33642456.	106620376.	208527552.	-69734.	5270217.	-69747.	0.	12.
181.410	348883552.	33735616.	106620376.	208527552.	-74190.	5196027.	-74202.	0.	12.
181.320	349032704.	33884768.	106620376.	208527552.	-118787.	5077240.	-118799.	0.	12.
181.230	349064224.	33916288.	106620376.	208527552.	-25092.	5052148.	-25105.	0.	12.
181.130	349071424.	33923484.	106620376.	208527552.	-5720.	5046428.	-5732.	0.	12.
181.040	349129920.	33981996.	106620376.	208527552.	-46592.	4999836.	-46605.	0.	12.
180.990	349126272.	33978340.	106620376.	208527552.	2924.	5002759.	2911.	0.	12.
180.940	349165376.	34017460.	106620376.	208527552.	-31147.	4971612.	-31160.	0.	12.
180.850	349270208.	34122276.	106620376.	208527552.	-83473.	4888140.	-83485.	0.	12.
180.750	349429696.	34281780.	106620376.	208527552.	-127031.	4761109.	-127043.	0.	12.
180.650	349556448.	34408524.	106620376.	208527552.	-100938.	4660171.	-100950.	0.	12.
180.560	349725632.	34577688.	106620376.	208527552.	-134726.	4525445.	-134739.	0.	12.
180.470	349932224.	34784296.	106620376.	208527552.	-164551.	4360894.	-164563.	0.	12.
180.370	350123424.	34975508.	106620376.	208527552.	-152288.	4208606.	-152300.	0.	12.
180.280	350291104.	35143188.	106620376.	208527552.	-133544.	4075062.	-133557.	0.	12.
180.180	350352544.	35204620.	106620376.	208527552.	-48919.	4026143.	-48931.	0.	12.
180.090	350333824.	35185892.	106620376.	208527552.	14930.	4041073.	14918.	0.	12.
180.060	350171136.	35023200.	106620376.	208527552.	129596.	4170669.	129583.	0.	12.
180.040	349947328.	34799392.	106620376.	208527552.	178274.	4348942.	178261.	0.	12.
179.910	350070848.	34922928.	106620376.	208527552.	-98384.	4250558.	-98397.	0.	12.
179.840	350165216.	35017296.	106620376.	208527552.	-75152.	4175406.	-75164.	0.	12.
179.760	350232800.	35084868.	106620376.	208527552.	-53809.	4121597.	-53821.	0.	12.
179.680	350278336.	35130392.	106620376.	208527552.	-36246.	4085350.	-36259.	0.	12.
179.590	350387072.	35239156.	106620376.	208527552.	-86618.	3998732.	-86631.	0.	12.
179.500	350381792.	35233860.	106620376.	208527552.	4230.	4002962.	4217.	0.	12.
179.400	350272832.	35124896.	106620376.	208527552.	86801.	4089763.	86789.	0.	12.
179.350	350206656.	35058736.	106620376.	208527552.	52709.	4142472.	52697.	0.	12.
179.300	350060928.	34913000.	106620376.	208527552.	116091.	4258564.	116079.	0.	12.
179.250	350004864.	34856924.	106620376.	208527552.	44678.	4303241.	44665.	0.	12.
179.200	349924512.	34776576.	106620376.	208527552.	64008.	4367250.	63996.	0.	12.
179.110	349434080.	34286160.	106620376.	208527552.	390626.	4757876.	390614.	0.	12.
179.030	349264896.	34116968.	106620376.	208527552.	134773.	4892649.	134761.	0.	12.
178.950	348937280.	33789360.	106620376.	208527552.	260951.	5153601.	260939.	0.	12.
178.860	348727872.	33579936.	106620376.	208527552.	166819.	5320419.	166806.	0.	12.
178.770	348529152.	33381230.	106620376.	208527552.	158281.	5478700.	158269.	0.	12.
178.680	348266496.	33118572.	106620376.	208527552.	209219.	5687919.	209206.	0.	12.
178.610	348152960.	33005026.	106620376.	208527552.	90452.	5778371.	90439.	0.	12.

TABLE VOL-2. ACCUMULATED WEIGHT BY SIZE CLASS.

```
     :    VF     :     F     :     M     :     C     :     VC    :
INFLOW
CLAY :.184962E+09:
SILT :.231203E+08:.231203E+08:.231203E+08:.231203E+08:
SAND :.616540E+07:.616540E+07:.616540E+07:.616540E+07:.308270E+07:
GRAV :.308270E+07:.750002E-18:.750002E-18:.750002E-18:.750002E-18:
C/BO :.750002E-18:

RIVER MILE =    199.070
CLAY :.184962E+09:
SILT :.231203E+08:.231203E+08:.231203E+08:.231203E+08:
SAND :.616297E+07:.615548E+07:.616482E+07:.616305E+07:.308167E+07:
GRAV :.213794E+07:18443.1    :28256.3    :5073.24    :1201.72    :
C/BO :1245.11    :

RIVER MILE =    198.960
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.850151E+07:.846835E+07:.799857E+07:.795178E+07:.396335E+07:
GRAV :.130283E+07:50234.8    :80691.7    :14682.4    :3445.39    :
C/BO :3259.54    :

RIVER MILE =    198.860
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.848788E+07:.843275E+07:.794517E+07:.787745E+07:.392207E+07:
GRAV :890526.    :60342.6    :114699.    :22350.7    :5197.32    :
C/BO :2955.01    :

RIVER MILE =    198.790
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.847908E+07:.840194E+07:.790937E+07:.782753E+07:.389358E+07:
GRAV :645921.    :70317.6    :143078.    :29032.2    :6829.35    :
C/BO :3314.49    :

RIVER MILE =    198.730
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.847053E+07:.837662E+07:.785375E+07:.774522E+07:.384716E+07:
GRAV :518340.    :60818.4    :137860.    :30569.6    :7311.72    :
C/BO :1954.47    :

RIVER MILE =    198.650
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.846228E+07:.835472E+07:.780476E+07:.767970E+07:.381336E+07:
GRAV :415813.    :55062.4    :129840.    :29983.3    :6835.33    :
C/BO :231.638    :

RIVER MILE =    198.590
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.845206E+07:.832431E+07:.775547E+07:.760817E+07:.377713E+07:
GRAV :328148.    :53217.1    :130306.    :30791.4    :6454.96    :
C/BO :.438064E-09:

RIVER MILE =    198.490
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.844402E+07:.829890E+07:.771663E+07:.754729E+07:.374586E+07:
GRAV :264313.    :50308.7    :124380.    :29608.8    :5548.10    :
C/BO :.438064E-09:

RIVER MILE =    198.400
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.844024E+07:.828829E+07:.773675E+07:.755229E+07:.374961E+07:
GRAV :227280.    :53307.4    :131176.    :30962.8    :5365.94    :
C/BO :.438064E-09:

RIVER MILE =    198.340
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.843750E+07:.828349E+07:.774909E+07:.755925E+07:.375341E+07:
GRAV :220091.    :59529.9    :141532.    :33081.0    :6203.20    :
C/BO :.438064E-09:

RIVER MILE =    198.300
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.843439E+07:.827638E+07:.770791E+07:.749023E+07:.372492E+07:
GRAV :222687.    :70232.8    :158445.    :36150.6    :7041.15    :
C/BO :868.409    :

RIVER MILE =    198.260
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.843310E+07:.827439E+07:.771491E+07:.749430E+07:.372673E+07:
GRAV :202966.    :75551.2    :169264.    :38052.2    :7567.85    :
C/BO :1485.92    :

RIVER MILE =    198.200
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
```

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SAND :.842243E+07:.826867E+07:.774021E+07:.752038E+07:.374051E+07:
GRAV :195711.    :83584.0    :187782.    :42358.5    :8696.27    :
C/BO :954.973    :

RIVER MILE =    198.110
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.840862E+07:.825268E+07:.777708E+07:.755336E+07:.375835E+07:
GRAV :196958.    :95480.7    :212397.    :47570.2    :9273.79    :
C/BO :811.586    :

RIVER MILE =    198.020
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.840371E+07:.824083E+07:.781610E+07:.757722E+07:.377130E+07:
GRAV :191810.    :111319.    :243674.    :52586.4    :8880.06    :
C/BO :.571888E-09:

RIVER MILE =    197.920
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.839641E+07:.821786E+07:.782477E+07:.756374E+07:.376394E+07:
GRAV :192259.    :121701.    :259671.    :55378.8    :8829.85    :
C/BO :.571844E-09:

RIVER MILE =    197.830
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.838272E+07:.818015E+07:.775523E+07:.754699E+07:.376635E+07:
GRAV :182662.    :131389.    :281830.    :60256.7    :9869.51    :
C/BO :1307.73    :

RIVER MILE =    197.740
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.837111E+07:.815709E+07:.775368E+07:.754990E+07:.376792E+07:
GRAV :180952.    :139458.    :300664.    :64525.9    :10846.8    :
C/BO :2583.81    :

RIVER MILE =    197.640
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.835543E+07:.810362E+07:.754335E+07:.741622E+07:.373154E+07:
GRAV :182698.    :153787.    :325281.    :69277.8    :11898.7    :
C/BO :3955.79    :

RIVER MILE =    197.540
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.833875E+07:.807823E+07:.753967E+07:.740727E+07:.372718E+07:
GRAV :167713.    :154629.    :336095.    :72390.6    :12554.5    :
C/BO :1475.11    :

RIVER MILE =    197.450
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.832198E+07:.804544E+07:.749898E+07:.739426E+07:.372041E+07:
GRAV :169125.    :163381.    :355047.    :76483.5    :13559.2    :
C/BO :2286.91    :

RIVER MILE =    197.350
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.831031E+07:.802638E+07:.750587E+07:.739897E+07:.372350E+07:
GRAV :160987.    :164865.    :366057.    :79208.8    :13526.2    :
C/BO :.342048E-09:

RIVER MILE =    197.260
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.829707E+07:.799838E+07:.748870E+07:.739351E+07:.371945E+07:
GRAV :158587.    :166562.    :373377.    :81241.4    :13941.0    :
C/BO :939.533    :

RIVER MILE =    197.160
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.827215E+07:.793409E+07:.724522E+07:.724806E+07:.367054E+07:
GRAV :152607.    :170359.    :384818.    :82482.5    :13124.8    :
C/BO :1935.12    :

RIVER MILE =    197.070
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.825929E+07:.790621E+07:.723032E+07:.721181E+07:.365321E+07:
GRAV :151368.    :168742.    :380301.    :81567.4    :12550.5    :
C/BO :1262.65    :

RIVER MILE =    196.980
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.825007E+07:.789265E+07:.724410E+07:.721241E+07:.365301E+07:
GRAV :153129.    :169780.    :383526.    :82787.5    :12822.7    :
C/BO :1190.10    :
```

```
RIVER MILE =    196.880
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.824244E+07:.788094E+07:.726753E+07:.722588E+07:.365957E+07:
GRAV :159654.    :175182.    :394106.    :85658.0    :13668.2    :
C/BO :2597.24    :

RIVER MILE =    196.790
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.823343E+07:.786000E+07:.726693E+07:.721640E+07:.365482E+07:
GRAV :153975.    :174499.    :398453.    :87764.3    :14335.4    :
C/BO :3850.25    :

RIVER MILE =    196.700
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.822174E+07:.783747E+07:.725575E+07:.720238E+07:.364792E+07:
GRAV :144963.    :171130.    :397675.    :88995.4    :14929.0    :
C/BO :4503.33    :

RIVER MILE =    196.610
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.820903E+07:.781649E+07:.725311E+07:.718643E+07:.363932E+07:
GRAV :136359.    :165976.    :391910.    :88966.2    :14944.2    :
C/BO :2804.65    :

RIVER MILE =    196.510
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.819109E+07:.779011E+07:.723237E+07:.717025E+07:.363154E+07:
GRAV :132891.    :164122.    :391069.    :89531.5    :15386.3    :
C/BO :3467.92    :

RIVER MILE =    196.420
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.817475E+07:.776481E+07:.722074E+07:.715075E+07:.362210E+07:
GRAV :135577.    :166198.    :394696.    :90591.4    :15766.1    :
C/BO :4132.68    :

RIVER MILE =    196.320
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.815007E+07:.772721E+07:.720277E+07:.714433E+07:.361920E+07:
GRAV :136169.    :166245.    :396649.    :91402.5    :16015.5    :
C/BO :2812.99    :

RIVER MILE =    196.230
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.812740E+07:.769446E+07:.720434E+07:.713867E+07:.361706E+07:
GRAV :130232.    :164183.    :398531.    :92273.4    :16228.6    :
C/BO :1259.40    :

RIVER MILE =    196.130
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.810476E+07:.765086E+07:.713715E+07:.710365E+07:.359965E+07:
GRAV :126777.    :163432.    :400243.    :93051.0    :16571.7    :
C/BO :1922.94    :

RIVER MILE =    196.040
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.808497E+07:.761702E+07:.709822E+07:.708466E+07:.359013E+07:
GRAV :131021.    :166877.    :407295.    :94770.0    :17024.4    :
C/BO :2702.73    :

RIVER MILE =    195.940
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.807457E+07:.760255E+07:.711364E+07:.708941E+07:.359246E+07:
GRAV :130174.    :164774.    :405197.    :95745.5    :17575.2    :
C/BO :3531.53    :

RIVER MILE =    195.850
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.806649E+07:.758888E+07:.713059E+07:.710115E+07:.359885E+07:
GRAV :127079.    :163344.    :403474.    :96169.3    :17981.4    :
C/BO :4234.68    :

RIVER MILE =    195.750
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.805934E+07:.757715E+07:.715969E+07:.712212E+07:.360973E+07:
GRAV :125802.    :162757.    :404309.    :96600.0    :18097.4    :
C/BO :3995.66    :

RIVER MILE =    195.660
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.805455E+07:.756899E+07:.717858E+07:.712288E+07:.361015E+07:
```

```
GRAV :121946.    :159744.    :399782.    :95735.1    :17639.2    :
C/BO :2585.41    :

RIVER MILE =    195.560
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.805151E+07:.756274E+07:.719107E+07:.711990E+07:.360825E+07:
GRAV :120094.    :157512.    :395685.    :95178.1    :17252.0    :
C/BO :.504289E-09:

RIVER MILE =    195.470
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.804373E+07:.755102E+07:.721390E+07:.713114E+07:.361437E+07:
GRAV :123763.    :160851.    :401430.    :96199.4    :17092.1    :
C/BO :377.673    :

RIVER MILE =    195.380
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.803998E+07:.754480E+07:.724404E+07:.714553E+07:.362206E+07:
GRAV :121820.    :159582.    :399779.    :95916.8    :16742.0    :
C/BO :28.9594    :

RIVER MILE =    195.280
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.803705E+07:.754007E+07:.726635E+07:.715047E+07:.362425E+07:
GRAV :120942.    :158830.    :398179.    :95568.2    :16416.4    :
C/BO :.504289E-09:

RIVER MILE =    195.190
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.803179E+07:.753224E+07:.725900E+07:.715365E+07:.362664E+07:
GRAV :118976.    :158266.    :397329.    :95337.7    :16294.7    :
C/BO :570.445    :

RIVER MILE =    195.160
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.803079E+07:.753071E+07:.726276E+07:.715473E+07:.362689E+07:
GRAV :118102.    :157756.    :396425.    :95142.0    :16196.6    :
C/BO :675.396    :

RIVER MILE =    195.090
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.802538E+07:.752601E+07:.727821E+07:.716350E+07:.363112E+07:
GRAV :117658.    :157352.    :395540.    :94942.0    :16063.9    :
C/BO :779.366    :

RIVER MILE =    195.000
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.802076E+07:.751956E+07:.729308E+07:.716737E+07:.363320E+07:
GRAV :115219.    :155586.    :392793.    :94475.0    :15827.7    :
C/BO :900.920    :

RIVER MILE =    194.910
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.801491E+07:.751148E+07:.730768E+07:.716838E+07:.363414E+07:
GRAV :112815.    :154282.    :390913.    :94082.6    :15661.2    :
C/BO :1061.42    :

RIVER MILE =    194.810
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.800688E+07:.749630E+07:.728354E+07:.713865E+07:.361889E+07:
GRAV :106561.    :150130.    :384787.    :92552.3    :14731.4    :
C/BO :403.655    :

RIVER MILE =    194.720
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.799900E+07:.748210E+07:.728773E+07:.712631E+07:.361283E+07:
GRAV :100953.    :146011.    :377449.    :90983.2    :14227.6    :
C/BO :169.994    :

RIVER MILE =    194.620
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.798863E+07:.746616E+07:.729821E+07:.712304E+07:.361165E+07:
GRAV :97321.8    :143670.    :373143.    :89937.2    :13724.7    :
C/BO :.477338E-09:

RIVER MILE =    194.530
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.797583E+07:.744076E+07:.730117E+07:.712547E+07:.361376E+07:
GRAV :95373.7    :141474.    :369715.    :89399.9    :13661.5    :
C/BO :618.931    :

RIVER MILE =    194.400
```

```
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.796425E+07:.742331E+07:.731274E+07:.712606E+07:.361429E+07:
GRAV :100317.    :144852.    :374952.    :90270.6    :13691.4    :
C/BO :752.837    :

RIVER MILE =    194.290
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.795777E+07:.741347E+07:.734363E+07:.715493E+07:.362970E+07:
GRAV :102544.    :145875.    :376353.    :90586.0    :13791.7    :
C/BO :1179.61    :

RIVER MILE =    194.210
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.795566E+07:.740800E+07:.732856E+07:.713630E+07:.361997E+07:
GRAV :91915.0    :139196.    :365140.    :87907.5    :12972.9    :
C/BO :1026.88    :

RIVER MILE =    194.090
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.795335E+07:.740009E+07:.731402E+07:.711567E+07:.360876E+07:
GRAV :71364.5    :122598.    :341664.    :83666.0    :11724.3    :
C/BO :57.8804    :

RIVER MILE =    194.010
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.795023E+07:.739149E+07:.729811E+07:.709430E+07:.359692E+07:
GRAV :60036.4    :112160.    :327095.    :81116.4    :10755.9    :
C/BO :3.75676    :

RIVER MILE =    193.930
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.794632E+07:.737898E+07:.727782E+07:.706693E+07:.358221E+07:
GRAV :51554.4    :102391.    :311683.    :78262.8    :9389.74    :
C/BO :.510560E-09:

RIVER MILE =    193.860
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.794181E+07:.736500E+07:.725221E+07:.703345E+07:.356434E+07:
GRAV :43165.5    :92507.0    :294635.    :74830.7    :7934.58    :
C/BO :.443482E-09:

RIVER MILE =    193.780
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.793775E+07:.735271E+07:.722955E+07:.700418E+07:.354883E+07:
GRAV :36523.5    :84046.0    :278519.    :71490.5    :6522.50    :
C/BO :.440985E-09:

RIVER MILE =    193.710
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.793529E+07:.734526E+07:.721606E+07:.698586E+07:.353914E+07:
GRAV :31605.7    :77585.8    :266054.    :68890.4    :5578.72    :
C/BO :.440985E-09:

RIVER MILE =    193.650
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.793256E+07:.733608E+07:.720728E+07:.697056E+07:.353077E+07:
GRAV :25517.4    :66129.1    :241069.    :63494.6    :3847.80    :
C/BO :.440985E-09:

RIVER MILE =    193.540
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.792757E+07:.732121E+07:.720923E+07:.695895E+07:.352471E+07:
GRAV :28963.2    :60077.3    :217407.    :58046.0    :3795.96    :
C/BO :88.7631    :

RIVER MILE =    193.450
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.792461E+07:.731341E+07:.719609E+07:.694044E+07:.351498E+07:
GRAV :27034.3    :56614.4    :209469.    :56256.8    :3095.48    :
C/BO :.416463E-09:

RIVER MILE =    193.360
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.792192E+07:.730683E+07:.718748E+07:.692713E+07:.350805E+07:
GRAV :27351.9    :55408.2    :205682.    :55344.4    :2742.12    :
C/BO :.416463E-09:

RIVER MILE =    193.240
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.791903E+07:.729845E+07:.717717E+07:.691151E+07:.349986E+07:
GRAV :26865.3    :52786.6    :198628.    :53544.5    :2125.01    :
```

```
C/BO :.416463E-09:

RIVER MILE =    193.160
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.791675E+07:.729395E+07:.718532E+07:.690608E+07:.349737E+07:
GRAV :29089.3    :54095.2    :199891.    :53400.6    :2028.09    :
C/BO :.416463E-09:

RIVER MILE =    193.070
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.791326E+07:.728599E+07:.718803E+07:.689695E+07:.349297E+07:
GRAV :33482.3    :56148.4    :199111.    :52793.9    :2023.41    :
C/BO :.416463E-09:

RIVER MILE =    192.970
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.791039E+07:.728015E+07:.719731E+07:.689055E+07:.348938E+07:
GRAV :36359.5    :57680.3    :197988.    :52234.1    :1982.74    :
C/BO :.416463E-09:

RIVER MILE =    192.880
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.790753E+07:.727517E+07:.721008E+07:.688858E+07:.348863E+07:
GRAV :39597.2    :60233.1    :203181.    :53319.9    :2358.24    :
C/BO :.416463E-09:

RIVER MILE =    192.780
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.790310E+07:.726843E+07:.722202E+07:.688881E+07:.348853E+07:
GRAV :40608.4    :60040.0    :201626.    :52725.3    :2633.49    :
C/BO :.416463E-09:

RIVER MILE =    192.690
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.789675E+07:.725789E+07:.723487E+07:.688931E+07:.348902E+07:
GRAV :41075.3    :59083.0    :197890.    :52034.6    :3219.87    :
C/BO :47.7530    :

RIVER MILE =    192.600
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.789188E+07:.724922E+07:.724756E+07:.688602E+07:.348730E+07:
GRAV :41747.2    :59074.4    :195187.    :51263.7    :3164.50    :
C/BO :.416463E-09:

RIVER MILE =    192.510
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.788255E+07:.723043E+07:.724344E+07:.687796E+07:.348386E+07:
GRAV :43960.9    :60558.1    :193956.    :51327.9    :4053.68    :
C/BO :472.939    :

RIVER MILE =    192.420
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.787513E+07:.721726E+07:.725541E+07:.687850E+07:.348460E+07:
GRAV :44025.6    :60349.7    :191796.    :50687.4    :4273.67    :
C/BO :155.010    :

RIVER MILE =    192.330
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.786962E+07:.720711E+07:.727252E+07:.687668E+07:.348424E+07:
GRAV :44466.1    :60510.1    :190564.    :50107.9    :4192.09    :
C/BO :.416463E-09:

RIVER MILE =    192.230
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.785518E+07:.717152E+07:.725272E+07:.684933E+07:.347130E+07:
GRAV :46118.3    :61679.2    :183833.    :47701.4    :4456.32    :
C/BO :111.775    :

RIVER MILE =    192.130
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.784765E+07:.715595E+07:.724747E+07:.683036E+07:.346218E+07:
GRAV :45560.7    :61203.5    :181001.    :46712.1    :4306.70    :
C/BO :.416463E-09:

RIVER MILE =    192.040
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.784193E+07:.714218E+07:.722578E+07:.680070E+07:.344651E+07:
GRAV :43904.6    :58676.2    :173199.    :45262.4    :3536.44    :
C/BO :.416463E-09:

RIVER MILE =    191.940
CLAY :.208528E+09:
```

```
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.783066E+07:.710800E+07:.719546E+07:.675762E+07:.342390E+07:
GRAV :41493.0    :55752.1    :159395.    :40323.1    :1637.94    :
C/BO :.416463E-09:

RIVER MILE =    191.840
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.782052E+07:.707867E+07:.716400E+07:.671654E+07:.340257E+07:
GRAV :35763.6    :51362.7    :146027.    :34666.4    :496.699    :
C/BO :.416463E-09:

RIVER MILE =    191.750
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.781116E+07:.705151E+07:.712911E+07:.667622E+07:.338246E+07:
GRAV :29936.9    :46785.2    :134076.    :29661.3    :175.525    :
C/BO :.416463E-09:

RIVER MILE =    191.650
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.780482E+07:.703334E+07:.710400E+07:.664710E+07:.336813E+07:
GRAV :26280.0    :43820.5    :125669.    :25797.2    :80.7112    :
C/BO :.416463E-09:

RIVER MILE =    191.550
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.779921E+07:.701612E+07:.708441E+07:.662457E+07:.335714E+07:
GRAV :21895.0    :38776.4    :112099.    :19787.2    :43.1367    :
C/BO :.416463E-09:

RIVER MILE =    191.460
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.779360E+07:.699921E+07:.706643E+07:.660439E+07:.334737E+07:
GRAV :18282.4    :33314.2    :97480.0    :13635.0    :4.59131    :
C/BO :.416463E-09:

RIVER MILE =    191.360
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.779001E+07:.698844E+07:.705806E+07:.659377E+07:.334264E+07:
GRAV :17480.4    :30063.1    :86764.1    :8946.09    :.185979E-02:
C/BO :.416463E-09:

RIVER MILE =    191.270
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.778639E+07:.697738E+07:.705205E+07:.657834E+07:.333511E+07:
GRAV :18902.3    :29530.4    :81693.1    :6970.61    :.676004E-09:
C/BO :.416463E-09:

RIVER MILE =    191.170
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.778279E+07:.696692E+07:.704185E+07:.656414E+07:.332845E+07:
GRAV :21738.1    :30337.3    :79555.7    :6119.12    :.676004E-09:
C/BO :.416463E-09:

RIVER MILE =    191.080
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.777458E+07:.694197E+07:.703052E+07:.654842E+07:.332277E+07:
GRAV :29510.2    :34752.9    :76552.5    :5781.74    :1.54409    :
C/BO :.416463E-09:

RIVER MILE =    190.990
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.777217E+07:.693540E+07:.702273E+07:.653982E+07:.331917E+07:
GRAV :29972.6    :35114.8    :75710.7    :5675.38    :.217406    :
C/BO :.416463E-09:

RIVER MILE =    190.890
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.777041E+07:.693102E+07:.701969E+07:.653696E+07:.331848E+07:
GRAV :28599.2    :34373.3    :73394.6    :5122.89    :.115769    :
C/BO :.416463E-09:

RIVER MILE =    190.800
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.776923E+07:.692763E+07:.702755E+07:.654276E+07:.332215E+07:
GRAV :29526.4    :35518.8    :74479.5    :5650.77    :2.87470    :
C/BO :.416463E-09:

RIVER MILE =    190.710
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.776910E+07:.692780E+07:.703487E+07:.654944E+07:.332582E+07:
GRAV :29798.5    :35729.3    :74344.7    :5739.02    :.317490E-01:
C/BO :.416463E-09:
```

```
RIVER MILE =    190.620
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.776800E+07:.692491E+07:.704474E+07:.654946E+07:.332664E+07:
GRAV :30798.3    :36638.7    :76023.5    :6391.54    :6.06446    :
C/BO :.416463E-09:

RIVER MILE =    190.530
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.776239E+07:.690793E+07:.705048E+07:.655185E+07:.332869E+07:
GRAV :36072.8    :41999.3    :84794.2    :8588.24    :95.3205    :
C/BO :.416463E-09:

RIVER MILE =    190.430
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.776146E+07:.690548E+07:.707246E+07:.655557E+07:.333074E+07:
GRAV :37457.2    :43320.5    :87714.8    :10016.8    :170.082    :
C/BO :.416463E-09:

RIVER MILE =    190.340
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.775881E+07:.689788E+07:.709128E+07:.655737E+07:.333175E+07:
GRAV :39543.4    :46279.3    :95117.5    :11862.5    :241.628    :
C/BO :.416463E-09:

RIVER MILE =    190.240
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.775638E+07:.689155E+07:.710223E+07:.655304E+07:.332961E+07:
GRAV :41071.6    :48172.2    :99267.0    :12876.5    :297.798    :
C/BO :.416463E-09:

RIVER MILE =    190.150
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.775382E+07:.688467E+07:.711439E+07:.656578E+07:.333696E+07:
GRAV :46468.8    :53364.5    :109821.    :15275.7    :610.309    :
C/BO :.416463E-09:

RIVER MILE =    190.050
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.774895E+07:.687243E+07:.710328E+07:.655060E+07:.332874E+07:
GRAV :36686.1    :46923.0    :100958.    :13950.5    :220.442    :
C/BO :.415188E-09:

RIVER MILE =    189.960
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.774439E+07:.685983E+07:.708856E+07:.653391E+07:.332035E+07:
GRAV :33430.7    :44909.7    :98636.2    :13647.0    :223.257    :
C/BO :.415188E-09:

RIVER MILE =    189.870
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.773974E+07:.684637E+07:.706720E+07:.650903E+07:.330733E+07:
GRAV :28301.0    :41186.0    :93553.3    :12737.2    :99.1251    :
C/BO :.413669E-09:

RIVER MILE =    189.770
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.772941E+07:.681130E+07:.701546E+07:.644964E+07:.327559E+07:
GRAV :17528.6    :30212.7    :74528.1    :8844.74    :29.1046    :
C/BO :.408671E-09:

RIVER MILE =    189.680
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.771754E+07:.677455E+07:.697263E+07:.640198E+07:.325027E+07:
GRAV :13898.0    :23932.8    :61192.7    :5775.32    :22.4326    :
C/BO :.408671E-09:

RIVER MILE =    189.580
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.770580E+07:.674234E+07:.693718E+07:.635351E+07:.322654E+07:
GRAV :14101.9    :22140.2    :54897.6    :5139.44    :32.2267    :
C/BO :.381501E-09:

RIVER MILE =    189.490
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.769330E+07:.671251E+07:.689673E+07:.630738E+07:.320224E+07:
GRAV :7786.15    :13834.1    :36825.7    :2319.76    :3.43239    :
C/BO :.314241E-09:

RIVER MILE =    189.390
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
```

```
SAND :.767628E+07:.667144E+07:.684543E+07:.624574E+07:.316783E+07:
GRAV :14526.6     :17744.0     :39167.5     :3547.11     :20.0341     :
C/BO :.283787E-09:

RIVER MILE =     189.310
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.766708E+07:.664883E+07:.681570E+07:.621407E+07:.315128E+07:
GRAV :11424.1     :15115.8     :33764.0     :3086.46     :21.5059     :
C/BO :.283787E-09:

RIVER MILE =     189.220
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.765673E+07:.662370E+07:.677782E+07:.617805E+07:.313066E+07:
GRAV :10370.3     :13714.1     :30752.1     :2897.11     :24.0471     :
C/BO :.283787E-09:

RIVER MILE =     189.120
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.764073E+07:.659314E+07:.671772E+07:.612299E+07:.310195E+07:
GRAV :12975.0     :15815.0     :34563.5     :3815.77     :90.1404     :
C/BO :.283787E-09:

RIVER MILE =     189.020
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.761224E+07:.653783E+07:.663066E+07:.605317E+07:.306369E+07:
GRAV :17857.5     :20130.0     :43399.8     :5876.31     :396.749     :
C/BO :.283787E-09:

RIVER MILE =     188.920
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.760547E+07:.652736E+07:.669797E+07:.612982E+07:.308281E+07:
GRAV :32077.5     :32868.1     :67389.2     :10953.9     :804.921     :
C/BO :.283787E-09:

RIVER MILE =     188.810
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.759769E+07:.651087E+07:.671738E+07:.615208E+07:.308577E+07:
GRAV :43032.4     :39723.1     :77687.9     :13089.0     :1403.18     :
C/BO :.283787E-09:

RIVER MILE =     188.700
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.759280E+07:.650353E+07:.679142E+07:.624613E+07:.311137E+07:
GRAV :49288.2     :46373.3     :91971.3     :15764.2     :1502.40     :
C/BO :.283787E-09:

RIVER MILE =     188.590
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.758491E+07:.649018E+07:.684585E+07:.631457E+07:.312723E+07:
GRAV :54356.6     :51714.2     :104348.     :19035.9     :2441.34     :
C/BO :.283787E-09:

RIVER MILE =     188.500
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.757906E+07:.647917E+07:.689766E+07:.637946E+07:.314018E+07:
GRAV :53220.3     :51526.7     :107485.     :20278.3     :2314.89     :
C/BO :.283787E-09:

RIVER MILE =     188.390
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.757164E+07:.646600E+07:.693610E+07:.643043E+07:.314475E+07:
GRAV :50665.2     :49976.8     :105972.     :20238.5     :2188.48     :
C/BO :.283787E-09:

RIVER MILE =     188.290
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.756630E+07:.645827E+07:.698026E+07:.648741E+07:.315502E+07:
GRAV :52452.2     :50638.8     :106862.     :21537.5     :3205.41     :
C/BO :129.465     :

RIVER MILE =     188.200
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.756277E+07:.645243E+07:.701782E+07:.653742E+07:.316189E+07:
GRAV :55346.1     :51901.2     :108708.     :22039.1     :3339.68     :
C/BO :.283787E-09:

RIVER MILE =     188.100
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.756072E+07:.644939E+07:.701638E+07:.656594E+07:.315977E+07:
GRAV :54673.9     :51515.9     :108495.     :22069.9     :3138.21     :
C/BO :.283787E-09:
```

```
RIVER MILE =     188.070
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755913E+07:.644749E+07:.700394E+07:.656439E+07:.315295E+07:
GRAV :53760.0     :50955.6     :107798.     :22068.6     :3138.99     :
C/BO :88.1350     :

RIVER MILE =     188.000
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755905E+07:.644967E+07:.704861E+07:.661922E+07:.316766E+07:
GRAV :58155.2     :52742.9     :110575.     :22757.2     :3759.17     :
C/BO :328.065     :

RIVER MILE =     187.910
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755846E+07:.644947E+07:.711095E+07:.670213E+07:.319065E+07:
GRAV :58100.0     :52237.2     :110432.     :23399.3     :4441.21     :
C/BO :579.006     :

RIVER MILE =     187.820
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755831E+07:.645080E+07:.717435E+07:.678424E+07:.321266E+07:
GRAV :58593.4     :52265.8     :110929.     :24133.8     :5250.42     :
C/BO :1339.72     :

RIVER MILE =     187.730
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755883E+07:.645369E+07:.722777E+07:.685253E+07:.323024E+07:
GRAV :61416.1     :52571.7     :111688.     :24660.4     :6125.74     :
C/BO :2320.22     :

RIVER MILE =     187.640
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755791E+07:.645432E+07:.730030E+07:.694886E+07:.325406E+07:
GRAV :61906.9     :52151.1     :111000.     :24727.6     :6344.92     :
C/BO :56.1376     :

RIVER MILE =     187.540
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755816E+07:.645657E+07:.737067E+07:.704399E+07:.327647E+07:
GRAV :63726.3     :52235.3     :110922.     :24855.5     :6524.89     :
C/BO :.283787E-09:

RIVER MILE =     187.450
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755826E+07:.645894E+07:.743439E+07:.712850E+07:.329404E+07:
GRAV :66609.5     :52304.8     :110632.     :25011.9     :7223.27     :
C/BO :67.3722     :

RIVER MILE =     187.360
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755907E+07:.646373E+07:.751016E+07:.722350E+07:.331519E+07:
GRAV :70545.6     :52446.1     :110491.     :25312.6     :7852.70     :
C/BO :.283787E-09:

RIVER MILE =     187.240
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.756080E+07:.646946E+07:.759718E+07:.733958E+07:.334557E+07:
GRAV :72443.9     :51000.9     :107861.     :25591.7     :8756.98     :
C/BO :836.226     :

RIVER MILE =     187.150
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755858E+07:.647048E+07:.765915E+07:.742491E+07:.336583E+07:
GRAV :71271.2     :50003.1     :106113.     :25370.2     :8757.01     :
C/BO :20.8259     :

RIVER MILE =     187.060
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755621E+07:.646852E+07:.771156E+07:.751010E+07:.338539E+07:
GRAV :71346.4     :49292.8     :104759.     :25254.0     :8666.90     :
C/BO :.460997E-09:

RIVER MILE =     186.970
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755328E+07:.646617E+07:.777677E+07:.760114E+07:.340562E+07:
GRAV :70778.4     :48312.7     :102889.     :24999.3     :8594.19     :
C/BO :.460998E-09:

RIVER MILE =     186.870
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755212E+07:.646701E+07:.784515E+07:.769301E+07:.342614E+07:
```

```
GRAV :70565.2     :47339.5     :101042.     :24827.8     :8819.45     :
C/BO :199.248     :

RIVER MILE =     186.780
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.755160E+07:.646783E+07:.790813E+07:.777737E+07:.344706E+07:
GRAV :70114.0     :45045.5     :96637.4     :24733.4     :9390.27     :
C/BO :1208.41     :

RIVER MILE =     186.690
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.754889E+07:.646634E+07:.795376E+07:.784989E+07:.346505E+07:
GRAV :69851.4     :44015.8     :94528.3     :24708.7     :9969.57     :
C/BO :2081.02     :

RIVER MILE =     186.610
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.754860E+07:.646629E+07:.799463E+07:.790374E+07:.347773E+07:
GRAV :66168.9     :40761.2     :89126.5     :24239.2     :10194.7     :
C/BO :2622.33     :

RIVER MILE =     186.550
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.754576E+07:.646226E+07:.803345E+07:.795670E+07:.348784E+07:
GRAV :64286.6     :38881.4     :85950.4     :24040.2     :10437.3     :
C/BO :3240.73     :

RIVER MILE =     186.460
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.753643E+07:.645279E+07:.808239E+07:.802875E+07:.350200E+07:
GRAV :62601.9     :36365.5     :81927.7     :23654.4     :10612.9     :
C/BO :2723.03     :

RIVER MILE =     186.360
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.752777E+07:.644485E+07:.813832E+07:.811013E+07:.351836E+07:
GRAV :61260.1     :34545.8     :78803.3     :23298.0     :10553.3     :
C/BO :2357.56     :

RIVER MILE =     186.270
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.752284E+07:.643789E+07:.818797E+07:.817802E+07:.352925E+07:
GRAV :60002.4     :32777.3     :75952.9     :22898.8     :10415.4     :
C/BO :2280.94     :

RIVER MILE =     186.190
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.751704E+07:.643067E+07:.823107E+07:.823685E+07:.353959E+07:
GRAV :60395.3     :31326.8     :72976.2     :22637.5     :10795.0     :
C/BO :3015.77     :

RIVER MILE =     186.100
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.751236E+07:.642239E+07:.827414E+07:.829942E+07:.355031E+07:
GRAV :63035.9     :30133.1     :69745.9     :22516.6     :11124.6     :
C/BO :3687.01     :

RIVER MILE =     186.000
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.750530E+07:.640740E+07:.828860E+07:.831684E+07:.353869E+07:
GRAV :59782.8     :28974.1     :67579.1     :21762.6     :9664.03     :
C/BO :.319349E-09:

RIVER MILE =     185.900
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.750143E+07:.639814E+07:.831938E+07:.835595E+07:.353895E+07:
GRAV :62074.1     :28253.6     :65534.4     :21536.3     :8871.77     :
C/BO :.319349E-09:

RIVER MILE =     185.810
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.749918E+07:.639391E+07:.837730E+07:.842911E+07:.354677E+07:
GRAV :62917.3     :27702.1     :63989.0     :21102.6     :8295.22     :
C/BO :.319349E-09:

RIVER MILE =     185.710
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.749806E+07:.639260E+07:.846633E+07:.854542E+07:.356763E+07:
GRAV :65272.0     :27498.6     :63013.6     :21073.8     :8246.05     :
C/BO :.319349E-09:

RIVER MILE =     185.610
```

```
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.749875E+07:.639448E+07:.852798E+07:.861869E+07:.358276E+07:
GRAV :67770.1    :27375.2    :62256.2    :21106.3    :7874.65    :
C/BO :.319349E-09:

RIVER MILE =    185.530
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.749941E+07:.639720E+07:.858405E+07:.868904E+07:.359592E+07:
GRAV :69181.4    :27373.0    :62003.1    :21176.1    :7789.99    :
C/BO :.319349E-09:

RIVER MILE =    185.460
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.749923E+07:.639867E+07:.863913E+07:.875943E+07:.360970E+07:
GRAV :70853.3    :27357.6    :61710.7    :21249.8    :7796.69    :
C/BO :.319349E-09:

RIVER MILE =    185.380
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.749859E+07:.639971E+07:.869535E+07:.883058E+07:.362233E+07:
GRAV :72153.6    :27251.5    :61167.8    :21253.5    :7912.13    :
C/BO :12.1798    :

RIVER MILE =    185.280
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.749235E+07:.638964E+07:.870778E+07:.888105E+07:.363125E+07:
GRAV :69017.1    :25887.3    :58275.6    :20576.0    :7513.09    :
C/BO :23.2450    :

RIVER MILE =    185.190
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.748239E+07:.637110E+07:.868762E+07:.888173E+07:.362251E+07:
GRAV :66102.3    :24402.3    :55567.0    :20131.5    :7325.83    :
C/BO :700.025    :

RIVER MILE =    185.100
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.747503E+07:.636003E+07:.871359E+07:.891847E+07:.362167E+07:
GRAV :63574.5    :23261.9    :53293.1    :19529.5    :7174.06    :
C/BO :574.589    :

RIVER MILE =    185.000
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.747031E+07:.635426E+07:.876275E+07:.898941E+07:.363779E+07:
GRAV :62577.3    :22291.3    :51426.4    :19362.2    :7393.44    :
C/BO :34.2568    :

RIVER MILE =    184.900
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.746477E+07:.634617E+07:.878714E+07:.902220E+07:.364072E+07:
GRAV :65101.3    :21099.9    :47713.4    :18439.6    :6500.23    :
C/BO :677.414    :

RIVER MILE =    184.810
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.745110E+07:.633594E+07:.879119E+07:.905558E+07:.364711E+07:
GRAV :69320.2    :20879.8    :46684.2    :18954.6    :7362.71    :
C/BO :1224.54    :

RIVER MILE =    184.710
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.744097E+07:.632183E+07:.880870E+07:.907697E+07:.364565E+07:
GRAV :64845.0    :20046.6    :45052.2    :18292.0    :7138.66    :
C/BO :.596716E-09:

RIVER MILE =    184.620
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.742993E+07:.629961E+07:.881070E+07:.908226E+07:.363420E+07:
GRAV :59505.6    :18973.7    :43142.8    :17392.2    :5936.60    :
C/BO :.545526E-09:

RIVER MILE =    184.530
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.741777E+07:.627405E+07:.878462E+07:.905582E+07:.360958E+07:
GRAV :55655.8    :18174.7    :41889.9    :16678.2    :5247.90    :
C/BO :.471446E-09:

RIVER MILE =    184.430
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.740738E+07:.625133E+07:.875660E+07:.902713E+07:.358538E+07:
GRAV :54303.9    :17445.4    :40572.2    :16040.7    :4810.86    :
```

```
C/BO :.471446E-09:

RIVER MILE =    184.330
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.740067E+07:.623804E+07:.874342E+07:.901306E+07:.357461E+07:
GRAV :53492.9    :16831.9    :39369.9    :15864.7    :5061.56    :
C/BO :538.922    :

RIVER MILE =    184.240
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.739360E+07:.622671E+07:.876072E+07:.903688E+07:.357249E+07:
GRAV :51847.1    :16103.0    :37868.2    :15417.8    :5084.58    :
C/BO :.471446E-09:

RIVER MILE =    184.140
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.738552E+07:.621273E+07:.878029E+07:.906561E+07:.357166E+07:
GRAV :51208.4    :15616.3    :36831.5    :15080.4    :4465.34    :
C/BO :.471446E-09:

RIVER MILE =    184.050
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.738118E+07:.620555E+07:.880821E+07:.910146E+07:.357557E+07:
GRAV :51448.6    :15244.3    :35865.7    :14818.4    :4711.95    :
C/BO :354.723    :

RIVER MILE =    183.960
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.737403E+07:.619871E+07:.884318E+07:.914847E+07:.358303E+07:
GRAV :51753.3    :15058.2    :35374.1    :14844.0    :5322.21    :
C/BO :.471446E-09:

RIVER MILE =    183.860
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.736879E+07:.619385E+07:.888964E+07:.921346E+07:.359720E+07:
GRAV :51954.0    :14917.1    :35021.4    :14931.2    :5866.09    :
C/BO :.471446E-09:

RIVER MILE =    183.770
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.736006E+07:.618654E+07:.884812E+07:.923907E+07:.360118E+07:
GRAV :52766.7    :14604.2    :34492.4    :15159.5    :6360.99    :
C/BO :1000.16    :

RIVER MILE =    183.670
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.735350E+07:.618184E+07:.882864E+07:.926941E+07:.360795E+07:
GRAV :57586.7    :14498.8    :33965.0    :15551.6    :6867.40    :
C/BO :1832.99    :

RIVER MILE =    183.580
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.734748E+07:.617426E+07:.884136E+07:.928103E+07:.360409E+07:
GRAV :55185.1    :13614.4    :32317.6    :15541.0    :7167.06    :
C/BO :2031.03    :

RIVER MILE =    183.490
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.733880E+07:.616039E+07:.883908E+07:.927117E+07:.359219E+07:
GRAV :54010.8    :13237.7    :31606.3    :15334.9    :6806.87    :
C/BO :1404.96    :

RIVER MILE =    183.390
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.731933E+07:.612171E+07:.872904E+07:.918243E+07:.356358E+07:
GRAV :51775.3    :12513.9    :30193.6    :14865.3    :6390.81    :
C/BO :1473.97    :

RIVER MILE =    183.300
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.730243E+07:.608782E+07:.868801E+07:.913255E+07:.353443E+07:
GRAV :46452.9    :11451.0    :28460.4    :13913.4    :5493.72    :
C/BO :689.023    :

RIVER MILE =    183.200
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.728541E+07:.605211E+07:.863552E+07:.905184E+07:.349261E+07:
GRAV :41100.9    :10212.1    :26252.3    :12953.6    :4804.65    :
C/BO :.750441E-09:

RIVER MILE =    183.110
CLAY :.208528E+09:
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```
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.726693E+07:.600909E+07:.856243E+07:.897757E+07:.345166E+07:
GRAV :35261.4     :8927.38     :23827.6     :11633.7     :3476.26     :
C/BO :.553266E-09:

RIVER MILE =     183.020
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.725075E+07:.597187E+07:.852214E+07:.893103E+07:.341814E+07:
GRAV :33217.2     :8424.88     :22604.7     :10991.0     :3066.70     :
C/BO :.548708E-09:

RIVER MILE =     182.920
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.723572E+07:.593571E+07:.847731E+07:.886817E+07:.338211E+07:
GRAV :33090.2     :8141.42     :21655.3     :10520.3     :2743.89     :
C/BO :.546823E-09:

RIVER MILE =     182.830
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.722007E+07:.589783E+07:.843146E+07:.880347E+07:.334415E+07:
GRAV :31650.3     :7715.52     :20526.2     :9857.63     :2424.74     :
C/BO :.537752E-09:

RIVER MILE =     182.740
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.720299E+07:.586128E+07:.839179E+07:.875359E+07:.331079E+07:
GRAV :30373.6     :7366.35     :19803.6     :9416.52     :1958.44     :
C/BO :.502326E-09:

RIVER MILE =     182.640
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.718532E+07:.582551E+07:.835880E+07:.871743E+07:.328388E+07:
GRAV :29813.1     :7142.76     :19245.6     :8903.84     :1796.91     :
C/BO :.502326E-09:

RIVER MILE =     182.550
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.716701E+07:.579010E+07:.833643E+07:.870685E+07:.326806E+07:
GRAV :30121.2     :6956.20     :18500.0     :8654.32     :1735.84     :
C/BO :.502326E-09:

RIVER MILE =     182.450
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.715326E+07:.576625E+07:.833358E+07:.870708E+07:.325709E+07:
GRAV :30881.1     :6827.02     :17902.5     :8666.07     :2078.16     :
C/BO :.502326E-09:

RIVER MILE =     182.360
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.714176E+07:.574624E+07:.832772E+07:.871038E+07:.325095E+07:
GRAV :31465.8     :6565.16     :17008.4     :8606.70     :2701.10     :
C/BO :672.600     :

RIVER MILE =     182.270
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.713135E+07:.572873E+07:.832496E+07:.870205E+07:.324094E+07:
GRAV :36171.3     :6776.37     :16674.3     :9116.29     :3605.98     :
C/BO :1437.72     :

RIVER MILE =     182.170
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.712249E+07:.571595E+07:.834595E+07:.871967E+07:.323953E+07:
GRAV :37442.8     :6737.84     :16220.5     :9310.36     :4274.97     :
C/BO :1088.32     :

RIVER MILE =     182.080
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.711141E+07:.569615E+07:.836433E+07:.874129E+07:.323930E+07:
GRAV :37073.9     :6551.17     :15669.2     :9387.15     :4482.24     :
C/BO :.443733E-09:

RIVER MILE =     181.990
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.710177E+07:.567991E+07:.840376E+07:.879343E+07:.324806E+07:
GRAV :37430.5     :6476.72     :15290.0     :9459.27     :4677.84     :
C/BO :.443733E-09:

RIVER MILE =     181.900
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.709186E+07:.566759E+07:.843930E+07:.884292E+07:.325524E+07:
GRAV :37616.7     :6414.19     :14823.1     :9428.06     :4524.11     :
C/BO :.443733E-09:
```

```
RIVER MILE =    181.820
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.708305E+07:.565757E+07:.847049E+07:.887530E+07:.325713E+07:
GRAV :37285.3    :6286.80    :14267.2    :9370.06    :4653.35    :
C/BO :45.3292    :

RIVER MILE =    181.740
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.707608E+07:.564819E+07:.850548E+07:.891431E+07:.325833E+07:
GRAV :40450.3    :6437.03    :14140.8    :9494.66    :4900.74    :
C/BO :.321639E-02:

RIVER MILE =    181.620
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.706962E+07:.563614E+07:.854698E+07:.896321E+07:.326056E+07:
GRAV :43521.5    :6603.96    :14069.0    :9526.83    :4647.22    :
C/BO :.836635E-09:

RIVER MILE =    181.510
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.706429E+07:.562732E+07:.858890E+07:.901474E+07:.326529E+07:
GRAV :46602.2    :6832.45    :14080.5    :9723.73    :4672.37    :
C/BO :.836635E-09:

RIVER MILE =    181.410
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.705747E+07:.561585E+07:.863595E+07:.907250E+07:.327152E+07:
GRAV :47865.8    :6883.36    :13940.5    :9685.77    :3953.03    :
C/BO :.836635E-09:

RIVER MILE =    181.320
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.705136E+07:.560691E+07:.869997E+07:.915555E+07:.328910E+07:
GRAV :47884.1    :6910.82    :13793.2    :9727.34    :3556.28    :
C/BO :.836635E-09:

RIVER MILE =    181.230
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.704060E+07:.559390E+07:.872607E+07:.918350E+07:.329003E+07:
GRAV :48024.8    :6916.58    :13499.6    :9919.48    :3826.86    :
C/BO :.836635E-09:

RIVER MILE =    181.130
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.702965E+07:.557880E+07:.874223E+07:.920248E+07:.328725E+07:
GRAV :48892.8    :6926.79    :13273.4    :9924.70    :4065.36    :
C/BO :.836635E-09:

RIVER MILE =    181.040
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.702201E+07:.557017E+07:.877075E+07:.924219E+07:.329395E+07:
GRAV :49212.9    :6967.56    :13133.0    :9932.49    :3685.61    :
C/BO :.836635E-09:

RIVER MILE =    180.990
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.701445E+07:.556209E+07:.877689E+07:.925105E+07:.329047E+07:
GRAV :49591.2    :6943.34    :12914.5    :10082.5    :3730.20    :
C/BO :136.514    :

RIVER MILE =    180.940
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.700778E+07:.555390E+07:.879792E+07:.927710E+07:.329114E+07:
GRAV :54140.9    :7326.12    :13072.3    :10564.4    :4180.88    :
C/BO :326.082    :

RIVER MILE =    180.850
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.699871E+07:.554918E+07:.884271E+07:.933139E+07:.330145E+07:
GRAV :59557.5    :7937.59    :13553.8    :11327.6    :5127.84    :
C/BO :1342.94    :

RIVER MILE =    180.750
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.698607E+07:.554541E+07:.890163E+07:.941515E+07:.332388E+07:
GRAV :66059.8    :8653.97    :14146.9    :12138.3    :6139.73    :
C/BO :2495.54    :

RIVER MILE =    180.650
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
```

```
SAND :.698128E+07:.554351E+07:.894954E+07:.947866E+07:.333903E+07:
GRAV :69477.2     :9160.46     :14582.4     :12917.6     :7074.59     :
C/BO :3293.53     :

RIVER MILE =     180.560
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.697760E+07:.554381E+07:.901199E+07:.955951E+07:.335923E+07:
GRAV :75072.8     :9715.49     :15062.5     :13692.4     :8052.67     :
C/BO :3954.87     :

RIVER MILE =     180.470
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.697195E+07:.554209E+07:.908027E+07:.966681E+07:.338989E+07:
GRAV :79783.7     :10339.2     :15657.6     :14528.2     :8951.44     :
C/BO :4035.48     :

RIVER MILE =     180.370
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.696622E+07:.553969E+07:.913624E+07:.977155E+07:.342002E+07:
GRAV :84464.7     :11135.8     :16440.7     :15594.7     :10081.2     :
C/BO :4071.07     :

RIVER MILE =     180.280
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.696240E+07:.554045E+07:.920527E+07:.985586E+07:.344215E+07:
GRAV :82527.4     :10987.3     :16429.1     :16089.0     :10615.3     :
C/BO :414.674     :

RIVER MILE =     180.180
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.692808E+07:.553747E+07:.922902E+07:.989059E+07:.345027E+07:
GRAV :105627.     :12707.6     :17535.0     :17089.0     :11498.9     :
C/BO :4722.70     :

RIVER MILE =     180.090
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.692367E+07:.553097E+07:.923459E+07:.989300E+07:.344540E+07:
GRAV :101301.     :12203.9     :16856.7     :16740.1     :11114.0     :
C/BO :52.3225     :

RIVER MILE =     180.060
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.692263E+07:.552855E+07:.919310E+07:.980849E+07:.341549E+07:
GRAV :98820.1     :12042.8     :16600.8     :16573.0     :10729.6     :
C/BO :183.919     :

RIVER MILE =     180.040
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.691921E+07:.552782E+07:.910458E+07:.970403E+07:.338641E+07:
GRAV :99902.1     :12312.3     :16779.9     :16876.4     :10703.1     :
C/BO :759.382     :

RIVER MILE =     179.910
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.692079E+07:.553238E+07:.915254E+07:.976422E+07:.340462E+07:
GRAV :92604.1     :11855.5     :16179.1     :16501.9     :10056.3     :
C/BO :1196.65     :

RIVER MILE =     179.840
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.691986E+07:.553416E+07:.918567E+07:.980710E+07:.341783E+07:
GRAV :94831.2     :12130.6     :16460.9     :16909.7     :10414.6     :
C/BO :1931.32     :

RIVER MILE =     179.760
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.691901E+07:.553516E+07:.921708E+07:.983855E+07:.342477E+07:
GRAV :92628.4     :11998.0     :16312.5     :17042.3     :10501.4     :
C/BO :1802.57     :

RIVER MILE =     179.680
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.691488E+07:.552928E+07:.922098E+07:.987614E+07:.343934E+07:
GRAV :90883.4     :11971.2     :16441.7     :17392.4     :10740.4     :
C/BO :2344.46     :

RIVER MILE =     179.590
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.691237E+07:.552608E+07:.926747E+07:.993634E+07:.345486E+07:
GRAV :84401.3     :11505.4     :16047.0     :17393.5     :10698.6     :
C/BO :1996.10     :
```

```
RIVER MILE =     179.500
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.690874E+07:.552269E+07:.927985E+07:.993401E+07:.344935E+07:
GRAV :83213.7     :11396.0     :15826.3     :17127.2     :10213.8     :
C/BO :1452.25     :

RIVER MILE =     179.400
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.690230E+07:.551434E+07:.924616E+07:.989600E+07:.343245E+07:
GRAV :79422.8     :11025.7     :15335.2     :16572.0     :9933.29     :
C/BO :1358.17     :

RIVER MILE =     179.350
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.689888E+07:.550924E+07:.923468E+07:.987002E+07:.342078E+07:
GRAV :74300.6     :10497.3     :14755.6     :15932.8     :9404.21     :
C/BO :235.444     :

RIVER MILE =     179.300
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.689314E+07:.550064E+07:.918813E+07:.981195E+07:.340064E+07:
GRAV :70868.2     :10154.1     :14290.2     :15314.4     :7801.88     :
C/BO :66.9652     :

RIVER MILE =     179.250
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.688784E+07:.549294E+07:.918403E+07:.979067E+07:.339002E+07:
GRAV :66672.6     :9687.54     :13657.8     :14500.8     :6905.79     :
C/BO :1.44313     :

RIVER MILE =     179.200
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.688049E+07:.548050E+07:.917070E+07:.976271E+07:.337548E+07:
GRAV :63743.5     :9345.49     :13173.4     :14004.4     :6437.01     :
C/BO :.133326E-08:

RIVER MILE =     179.110
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.686004E+07:.543621E+07:.902144E+07:.957419E+07:.330791E+07:
GRAV :51540.9     :8106.00     :11607.9     :12127.6     :2983.76     :
C/BO :.524213E-09:

RIVER MILE =     179.030
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.684611E+07:.540897E+07:.898068E+07:.951958E+07:.328152E+07:
GRAV :47251.2     :7591.12     :10955.3     :11664.7     :2638.68     :
C/BO :.476305E-09:

RIVER MILE =     178.950
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.682578E+07:.537447E+07:.886748E+07:.941089E+07:.323899E+07:
GRAV :42139.0     :6972.86     :10107.0     :10487.4     :2047.59     :
C/BO :.475161E-09:

RIVER MILE =     178.860
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.680793E+07:.533953E+07:.882099E+07:.933722E+07:.320594E+07:
GRAV :39931.1     :6671.81     :9676.42     :10032.4     :2012.92     :
C/BO :.388680E-09:

RIVER MILE =     178.770
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.679103E+07:.530739E+07:.877712E+07:.927010E+07:.317208E+07:
GRAV :36973.7     :6308.64     :9180.33     :9377.11     :1671.57     :
C/BO :.388680E-09:

RIVER MILE =     178.680
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.677282E+07:.527217E+07:.871456E+07:.917295E+07:.313078E+07:
GRAV :32264.5     :5727.44     :8394.56     :8342.30     :566.027     :
C/BO :.388680E-09:

RIVER MILE =     178.610
CLAY :.208528E+09:
SILT :.266551E+08:.266551E+08:.266551E+08:.266551E+08:
SAND :.676569E+07:.525979E+07:.868418E+07:.912957E+07:.311372E+07:
GRAV :30352.0     :5463.36     :7992.01     :7739.65     :542.402     :
C/BO :.365319E-09:

EXCESSIVE DEPOSITS (IE END AREA EXCEEDED FLOW AREA IN     58  EVENTS.
       CROSS SECTION        PERCENT       WATER DISCHARGE RANGE
      SEQUENCE    RIVER     OF TIME       Q MAX       Q MIN
       NUMBER      MILE
```

```
SEGMENT   1  Rio Watercourse Master Plan 82000240
         10      179.300      0.267   76000.00  76000.00
         20      180.060      0.267  140100.00 110100.00
        173      194.090      2.667  120000.00  95500.00
        181      194.910      0.067   35000.00  35000.00
        183      195.090      0.133   52200.00  39000.00
        186      195.280      0.133   90000.00  90000.00
        227      198.860      0.333   79000.00  79000.00

WARNING: SILT+CLAY CONCENTRATIONS IN EXCESS OF    48535. MGL
         WERE DETECTED     5791  TIMES IN SUBROUTINE SRMOD5.

         MUDFLOW CONCENTRATIONS (SILT+CLAY IN EXCESS OF  1325000. MGL
         WERE DETECTED        0  TIMES.

READING INPUT DATA FROM file_name        = BASEP.T5
PRINTOUT WRITTEN TO file_name            = BASEP.T6

    0 FATAL DATA ERRORS DETECTED.


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DO NOT ADD HYDROLOGIC DATA SET (OPTION = OFF)
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Table 1

Sediment Discharge Data for the Gila River Near Gillespie Dam

Date	Water Discharge cfs	Sediment Discharge tons/day	Group Averages	
			Water Discharge cfs	Sediment Discharge tons/day
01-12-93	65,000	2,630,000	30,025	784,625
02-17-95	23,800	129,000		
03-03-93	21,000	286,000		
03-30-93	10,300	93,500		
05-27-93	3,450	4,830	1,518.5	1,481.7
05-07-93	1,500	960		
11-19-93	610	92.2		
03-24-94	514	44.4		

The total sediment load consists of clays, silts, sands, gravels and cobbles. HEC-6T models these different sizes based on the fraction of total load and separates each into different classes. Clay has only one class size (finer than 0.004 mm). Silt is divided into four classes and ranges from 0.004 mm to 0.0625 mm. In HEC-6T, clay and silt is subject to sedimentation (fill) but not erosion (scour). Sand is divided into five classes and ranges from 0.062 to 2.0 mm. Gravel is also divided into five classes and ranges from 2.0 mm to 64.0 mm. For this model, only small cobbles (ranging from 64 mm to 128 mm) were included in the inflowing sediment. The fraction of the total load for each of the classes was obtained by the following procedure.

1. A HEC-6T model was built that included the cross sectional geometry described in Subsection Hydraulic Data and Other Model Input, bed gradation described previously, and a constant channel forming discharge, 38,000 cfs. Only the inflowing sediment for sands, gravels and cobbles were included in the model, clays and silts were not included.

2. A $RE (recirculation) record was added to the model. This command takes the sediment passing the downstream boundary and recirculates it as the inflowing sediment load. The final gradation of the inflowing sediment was set at the point at

which the inflowing sediment no longer changes, that is, an equilibrium in the inflowing and outflowing sediment by size fraction.

3. Based on the sediment size gradation data, the sands, gravels and cobbles are estimated to be ten percent of the total load. Silts are estimated to be 40 percent of the total load and clay 50 percent. The size gradation curve for the inflowing sediment is shown in Figure 30 with bed material gradation and listed in Table 2.

Table 2

Percent Finer, Faction of Total Load and Classification for Inflowing Sediment

Classification	Percent Finer	Fraction of Total Load	Largest Size in Classification mm
Clay	60.0	60.0	0.004
Very Fine Silt	67.5	7.5	0.008
Fine Silt	75.0	7.5	0.016
Medium Silt	82.5	7.5	0.032
Coarse Silt	90.0	7.5	0.0625
Very Fine Sand	93.0	3.0	0.125
Fine Sand	95.5	2.5	0.25
Medium Sand	97.1	1.6	0.5
Coarse Sand	99.5	2.4	1
Very Coarse Sand	99.8	0.3	2
Very Fine Gravel	100.0	0.2	4

Erosion and Deposition Limits

The erosion and deposition limits were set for each cross section using the HE and HD record, respectively. The erosion limits were set near the Baker model bank stations. If HEC-6T calculates scour at a cross section the geometry data will be lowered only between these two points for all geometry points below the calculated water surface. The deposition limits were set to the ends of the cross section. If HEC-6T calculates deposition at a cross section only the geometry points that are below the calculated water surface will be raised. The depth of sediment reservoir for the cross sections is set to 10 feet. That limits the scour or streambed degradation to 10 feet, or less. Model results are checked to verify that the 10-foot limit is not reached.

HYDRAULIC DATA AND OTHER MODEL INPUT

General

The hydraulic data describes the physical geometry of the watercourse and flow resistance factors. The data is essentially the same information that is required for a water surface profile analysis, such as performed using HEC-2 or HEC-RAS. The

existing HEC-RAS model of the Gila River that previously was developed by others for the purpose of a floodplain delineation study is used as the sources of the hydraulic and geometric data. Certain modifications were made to the model to achieve the purpose of sediment studies.

Modifications to the Geometry

The Baker hydraulics model contains the following features:

- 233 cross sections for approximately 20.5 miles of the Gila River with a spacing of approximately 500 feet. The geometry for the cross sections was generated after the 1993 flood.
- Four bridges located at State Route 85, Tuthill Road, Estrella Parkway, and Bullard Avenue.
- Multiple Manning's roughness coefficients for the channel and overbanks. The n-value for areas in the main channel ranged from 0.026 to 0.032. The n-value in the densely vegetative zones were as high as 0.15.
- Bank stations were, in general, located near the floodway boundary with an average channel width of 3,500 feet.

Modifications were made to the model for erosion and sedimentation modeling purposes. These include reducing the number of cross sections, removing the bridges, relocating the bank stations, and changing the n-values. The number of cross sections were reduced for sediment and erosion modeling for the following reasons:

- Remove cross sections that may be biased towards constrictions, such as bridges.
- Remove cross sections that reflect local conditions, which can not be modeled by HEC-6T, a one-dimensional sediment transport model.
- Leave cross sections that represent the reach averaged conditions of the Gila River.

- Reduce the instability due to sudden changes in top width, effective depth (hydraulic depth), and Froude number.

The number of cross sections were reduced by plotting the top width, effective depth and Froude number and then removing cross sections that were greater than two standard deviations from the average. This reduced the number of cross sections to 115. Further discussion of process of removing the cross sections is included in the Hydrology and Hydraulics Report.

The bridges were removed because HEC-6T does not have the capability to model bridges. No other adjustments were made to the cross sections up and downstream of the bridges.

The bank stations were moved to include only the main channel where the majority of the sediment transport is taking place. The bank stations in the HEC-6T model are approximately 1,500 feet wide and follow the corridor cleared by the FCDMC. The locations were further refined by adjusting for dense vegetative zones. HEC-6T uses the area between the bank stations to calculate the hydraulics for the sediment transport analysis.

The Brownlie equation (Brownlie, 1983) is used as a predictor for bed-roughness in the channel. The equation will adjust the Manning's n-value based on the flow regime, grain size in the active bed, hydraulic radius and bed slope. In general, the range of calculated Manning's n-value is between 0.02 and 0.06. HEC-6T allows one n-value for the left and right overbank. A conveyance weighted n-value from the Baker hydraulics model is used. It is assumed that the overbank n-values do not change with depth, elevation or discharge of water.

Boundary Conditions

In HEC-6T, the water surface elevation is specified at the downstream limit at each hydrograph time step using a rating curve. The rating curve is developed using the HEC-RAS model and is shown in Figure 31.

Other Input Data

The following is a list of other input data

- The fraction of bed material that is exposed to erosion is set to 100 percent. This indicates that the entire bed is allowed to erode.
- The specific gravity of bed material is set to the HEC-6T default of 2.65.
- The grain shape factor is set to the HEC-6T default of 0.667. A shape factor of a perfect sphere is 1.0 while a very irregular shape has a factor as low as 0.1.
- The coefficient in surface area exposed is set to the HEC-6T default of 0.5.
- The unit weight of deposited sediment is set to the HEC-6T default of 93 pounds per cubic feet.
- The water temperature is set to 68° Fahrenheit.

LIMITATIONS AND ASSUMPTIONS

The following are the major limitations and assumptions made in HEC-6T modeling for this study:

- The Gila River is a highly complicated and variable system. Certain modeling assumptions were applied to simplify the system for a one-dimensional sediment transport model.
- The HEC-6T program requires appropriate input data based on physical measurements and data analysis.
- Interpretation of HEC-6T results is contingent upon model input and the limitation of certain modeling options.
- Model results are based on hydraulic geometry data from previous floodplain studies in 1993. The model does not account for changes in the river since 1993 nor future

changes in the watercourse. Future changes include development, sand and gravel operations, increased vegetation, vegetation removal, and other man-made influences.

- HEC-6T can not model bridges or culverts. There are four bridges in the study area, State Route 85, Tuthill Road, Estrella Parkway and Bullard Avenue. The geometry of the cross sections near the bridges was not modified.

- The modeling assumes the vegetation does not change during the hydrologic event.

- Size gradation of the bed material is represented by a finite sampling of that material. Although the sample size is quite large, it represents a small area of the watercourse. Sensitivity analysis indicates that uncertainty in this parameter has small effect on model results. One set of bed material is applied across the cross section, and includes the main channel, braids and overbanks.

- HEC-6T can only model erosion or sedimentation during a time step. It is possible to for the river to experience erosion and scour at a cross section at the same time. Also HEC-6T can not model the lateral movement of the main channel.

- Inflowing sediment for tributaries of the Gila River, such as the Agua Fria River and Waterman Wash, are assumed to be negligible because the discharges from the tributaries are relatively small compared to the discharges of the Gila River during floods. Inflowing sediment is defined for the upper boundary of the study.

- Inflowing sediment loads are transport capacity controlled and are estimated by sediment transport methodologies using data near Gillespie Dam. The inflowing sediment does not vary for each event or temporally during the event.

- The period of record used for the hydrologic data is representative of what the watercourse may see in the future. Flow rates less than the 10-year event are not modeled. Those sediment transport rates are relatively low and the hydraulics of those flows are inconsequential in regard to the channel forming capacity of larger floods.

- Starting water surface elevations that are based on normal depth hydraulics assume a stable reach with neither scour nor fill.

- Sediment transport in the watercourse can by modeled by Yang Stream Power Function.

MODELING VERIFICATION

GENERAL

Model verification is used to compare model results to measured data on the Gila River. There are two gages near the study area on the Gila River, Gila River at Estrella Parkway (USGS gage 09514100) and Gila River at Gillespie Dam (USGS gage 09518000). Gila River at Gillespie Dam is the only location where sediment data was collected. The dam is located approximately 11 miles southwest of the downstream boundary of the model. Water discharge data collection started in 1921 when the dam was built. The first sediment samples were collected during 1975. During 1993 the dam was breached by flooding. The collected samples are divided into two parts, post-breach and pre-breach. For the post-breach, there are eight suspended-sediment measurements of which three also provide percent sand fraction. For the pre-breach, there are 29 suspended-sediment measurements of which 27 provide the sand fraction. The data are shown in two parts because sediment filled the area behind the dam shortly after the building of the dam. For several miles upstream of the dam the slope was shallower with less sediment transport capacity. At the same time the sediment deposition was occurring dense vegetated growth started within the floodplain. The dense growth further trapped sediment. During the 1993 flood event the dam was breached washing out some of the sediment deposit. Pre- and post- dam breach topography was compared and approximately ten percent of the total sediment load carried by the flood past the dam was derived by erosion from this area during the flood.

VERIFICATION MODEL

The verification was completed by comparing a model with just the 1993 event hydrology to the pre- and post-breach data. The following graphs were developed from the results and are shown on Figures 32 through 37:

- Figure 32, Comparison of Total Load Concentration for Inflowing and Outflowing Sediment – The inflowing sediment is the total sediment entering the model at the upstream boundary for each hydrologic data point. The outflowing sediment is the

total sediment exiting the model at the downstream boundary for each hydrologic data point. These values include clays, silts, sands, gravels and cobbles.

- Figure 33, Comparison of Sand Concentration for Inflowing and Outflowing Sediment – The inflowing sediment is the total of sands, gravels and cobbles entering the model at the upstream boundary for each hydrologic data point. The outflowing sediment is the total of sands, gravels and cobbles exiting the model at the downstream boundary for each hydrologic data point.

- Figure 34, Comparison of Total Load Concentration at Various Discharges – For each time step the total load concentration of each cross section is shown.

- Figure 35, Comparison of Sand Concentration at Various Discharges – For each time step the concentration of the total of sands, gravels and cobbles for each cross section is shown.

- Figure 36, Comparison of Total Load Concentration at Various Cross Sections – For each cross section the total concentration of each time step is shown.

- Figure 37, Comparison of Sand Concentration at Various Cross Sections – For each cross section the concentration of the total of sands, gravels and cobbles for each time step is shown.

RESULTS

A line was fitted to the total suspended load concentration post-breach data by grouping and averaging the four greatest and four smallest sediment and water discharge data. Then the line was adjusted by ten percent to account for the sediment eroded from upstream of the dam. The results of total sediment load concentration from the HEC-6T models plot very closely or on that line as shown in Figures 32, 34 and 36. The total suspended-sediment concentration includes clays, silts and sands. Clays and silts make as much as 90 percent of the inflowing sediment (see Figure 30). An equation developed by Krone (1962) is used for the deposition and transport of clays and silts in the bed material. Majority of the small particles are washed into the watercourse and stay

suspended. In general, the amount of clays and silts entering the upstream cross section will exit the downstream cross section.

The amount of sand was estimated to be approximately ten percent of the adjusted total load as previously discussed and as illustrated in Figure 30. As the flood event moves through the study area the water will erode or deposit sediment based on the hydraulics, sediment inflowing into the cross section, bed material at that point in time and the Yang stream function. Figure 33 shows the concentration of sand inflowing into the model at the upstream boundary closely matching this line. The concentration of sand at the downstream boundary of the model is approximately 53 percent higher than at the upstream boundary. Figures 35 and 37 show a scatter of results for various discharges and cross sections above and below the ten percent line with a majority of the results above the line. This indicates that the model is able to transport more sand than the estimated ten percent.

The verification results indicate that the behavior of the model is similar to the measurements collected near Gillespie Dam. The majority of the wash load, clays and silts, will stay suspended and move through the system. The bed material load, sands, gravels and cobbles, will be eroded or deposited depending on the hydraulic characteristics of the river section. Majority of the time the river can carry more than the initial estimate of ten percent.

Hydrology Data
El Rio Sediment Model

Date	Number of Days	Mean Daily Discharge cfs
28-Dec-23	1	70,000
17-Feb-27	2	51,200
18-Feb-27	3	60,000
19-Feb-27	4	38,700
02-Jan-66	5	48,800
03-Mar-78	6	39,500
04-Mar-78	7	80,700
05-Mar-78	8	40,800
20-Dec-78	9	90,400
21-Dec-78	10	76,400
22-Dec-78	11	53,200
23-Dec-78	12	43,300
24-Dec-78	13	38,800
19-Jan-79	14	79,300
20-Jan-79	15	73,200
21-Jan-79	16	59,700
22-Jan-79	17	45,000
30-Mar-79	18	54,600
31-Mar-79	19	45,700
01-Apr-79	20	38,700
16-Feb-80	21	112,000
17-Feb-80	22	124,000
18-Feb-80	23	83,900
19-Feb-80	24	88,700
20-Feb-80	25	98,300
21-Feb-80	26	93,300
22-Feb-80	27	108,000
23-Feb-80	28	78,900
24-Feb-80	29	59,700
25-Feb-80	30	56,000
26-Feb-80	31	38,300
04-Oct-83	32	41,800
05-Oct-83	33	77,000
06-Oct-83	34	67,500
09-Jan-93	35	130,000
10-Jan-93	36	60,000
11-Jan-93	37	75,000
12-Jan-93	38	65,000
13-Jan-93	39	60,000
14-Jan-93	40	65,000
15-Jan-93	41	65,000
16-Jan-93	42	80,000
17-Jan-93	43	75,000
18-Jan-93	44	90,000
19-Jan-93	45	85,000
20-Jan-93	46	70,000
21-Jan-93	47	85,000
22-Jan-93	48	80,000

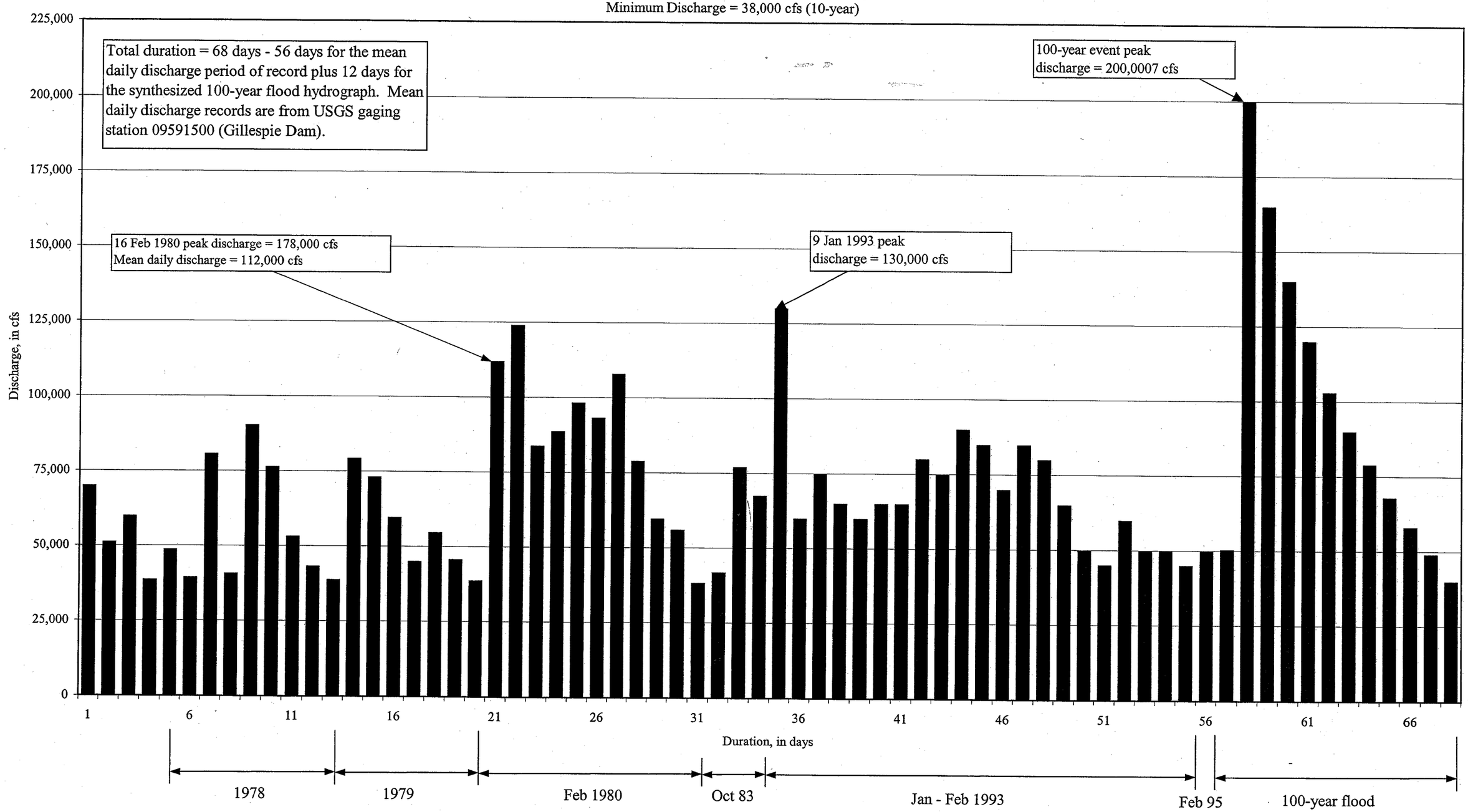
Hydrology Data
El Rio Sediment Model

Date	Number of Days	Mean Daily Discharge cfs
23-Jan-93	49	65,000
24-Jan-93	50	50,000
25-Jan-93	51	45,000
21-Feb-93	52	60,000
22-Feb-93	53	50,000
23-Feb-93	54	50,000
24-Feb-93	55	45,000
16-Feb-95	56	50,000

100-Year Event Discretized Hydrograph

Discretized Hydrograph	
Time days	**Discharge cfs**
0.5	0
0.5	50,313
1.5	50,313
1.5	200,007
2.5	200,007
2.5	165,000
3.5	165,000
3.5	140,000
4.5	140,000
4.5	120,000
5.5	120,000
5.5	103,000
6.5	103,000
6.5	90,000
7.5	90,000
7.5	79,000
8.5	79,000
8.5	68,000
9.5	68,000
9.5	58,000
10.5	58,000
10.5	49,000
11.5	49,000
11.5	40,000
12.5	40,000

Figure 27
Hydrologic Data for Sediment Modeling
Minimum Discharge = 38,000 cfs (10-year)



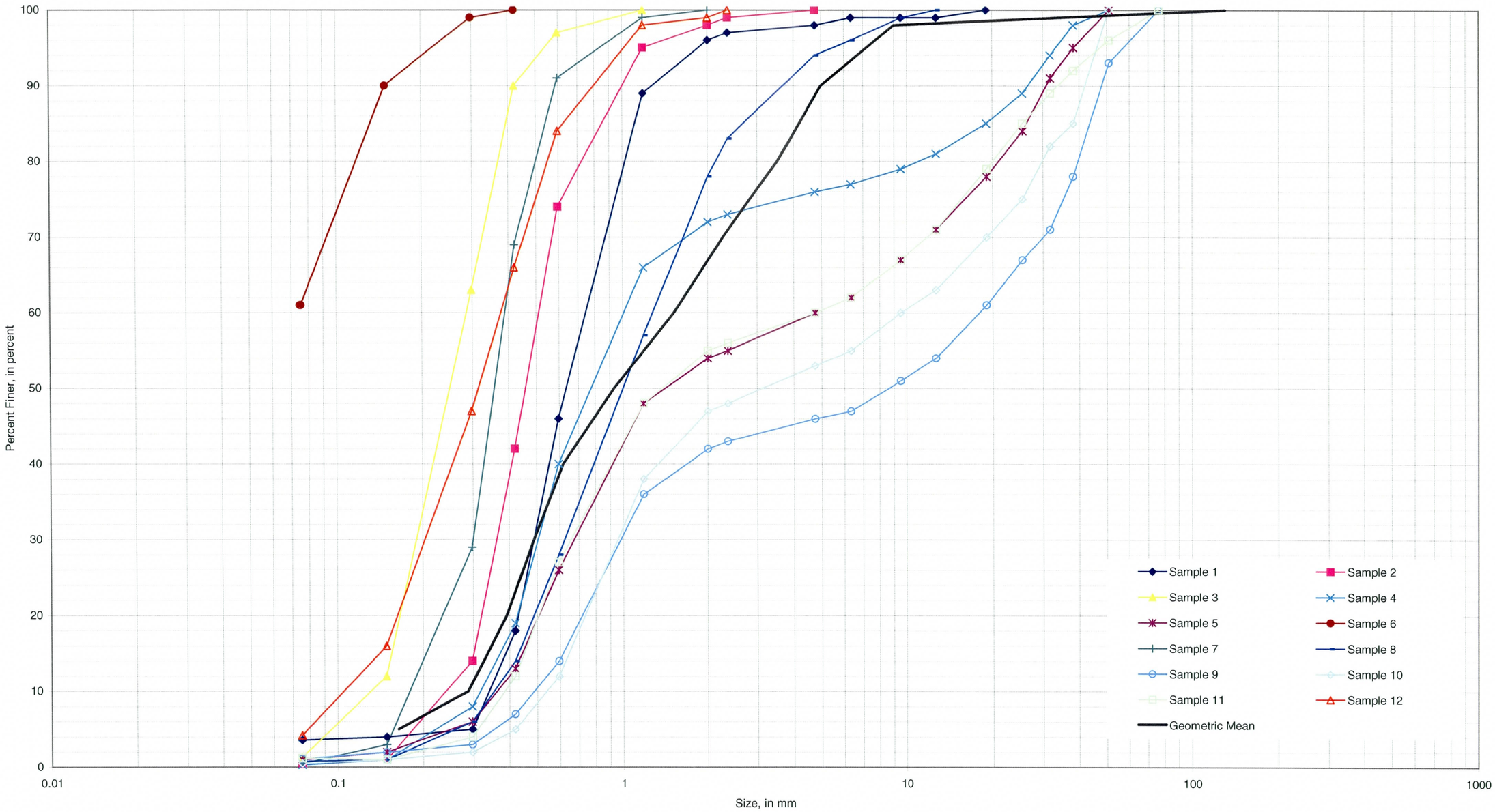
El Rio Watercourse Master Plan
182000240
Sieve Analysis

Sieve	Sieve Opening (mm)	Sample 1 Near SR85 Bridge	Sample 2 Near SR85 Bridge	Sample 3 Bullard Ave Bridge	Sample 4 Bullard Ave Bridge	Sample 5 Waterman Wash	Sample 7 WP 4-5	Sample 8 WP 6	Sample 9 WP 9 @ 1.0'	Sample 10 WP 9 @ 1.5'	Sample 11 WP 10	Sample 12 WP 11	Sample 6 WP 3
#200	0.075	3.6	0.4	1.3	0.3	1	0.5	0.8	1.1	0.5	1.2	4.2	61
#100	0.149	4	1	12	1	2	3	1	2	1	1	16	90
#50	0.297	5	14	63	8	6	29	6	3	2	4	47	99
#40	0.42	18	42	90	19	13	69	14	7	5	12	66	100
#30	0.595	46	74	97	40	26	91	28	14	12	27	84	100
#16	1.18	89	95	100	66	48	99	57	36	38	48	98	100
#10	2	96	98	100	72	54	100	78	42	47	55	99	100
#8	2.36	97	99	100	73	55	100	83	43	48	56	100	100
#4	4.75	98	100	100	76	60	100	94	46	53	60	100	100
	6.35	99	100	100	77	62	100	96	47	55	62	100	100
	9.52	99	100	100	79	67	100	99	51	60	67	100	100
	12.70	99	100	100	81	71	100	100	54	63	71	100	100
	19.05	100	100	100	85	78	100	100	61	70	79	100	100
	25.40	100	100	100	89	84	100	100	67	75	85	100	100
	31.75	100	100	100	94	91	100	100	71	82	89	100	100
	38.10	100	100	100	98	95	100	100	78	85	92	100	100
	50.80	100	100	100	100	100	100	100	93	100	96	100	100
	76.20	100	100	100	100	100	100	100	100	100	100	100	100
	152.39												

Final Bed Material Used in Model

Percent Finer	Geometric Mean mm
5	0.16
10	0.29
20	0.39
30	0.49
40	0.62
50	0.93
60	1.51
70	2.27
80	3.52
90	4.97
98	8.99
100	130.00

Figure 28
Sieve Analysis Results



Very Fine Sand	Fine Sand	Medium Sand	Coarse Sand	Very Coarse Sand	Very Fine Gravel	Fine Gravel	Medium Gravel	Coarse Gravel	Very Coarse Gravel	Small Cobbles	Large Cobbles	Small Boulders

Figure 32
Comparison of Total Load Concentration for Inflowing and Outflowing Sediment

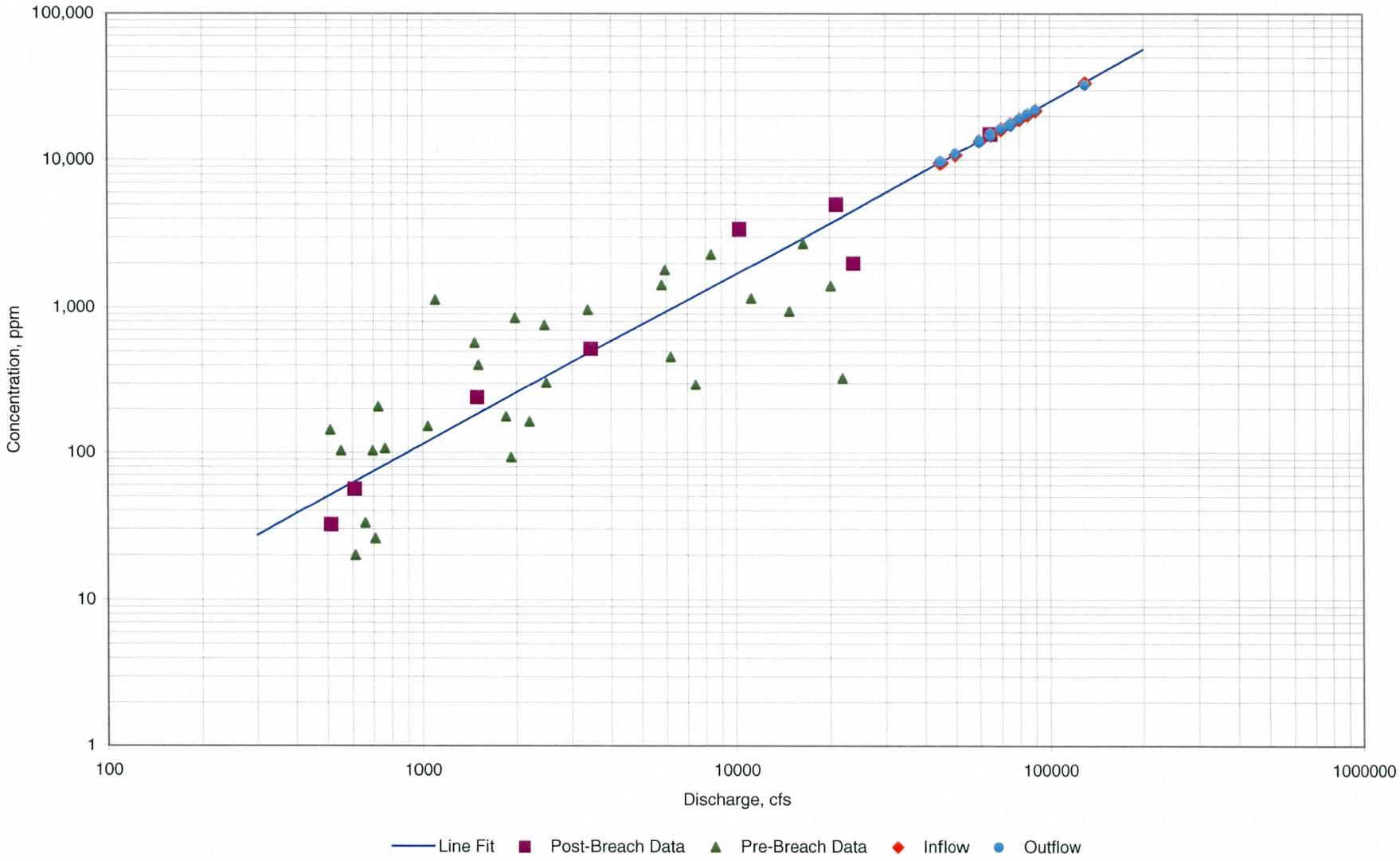


Figure 33
Comparison of Sand Concentration for Inflowing and Outflow Sediment

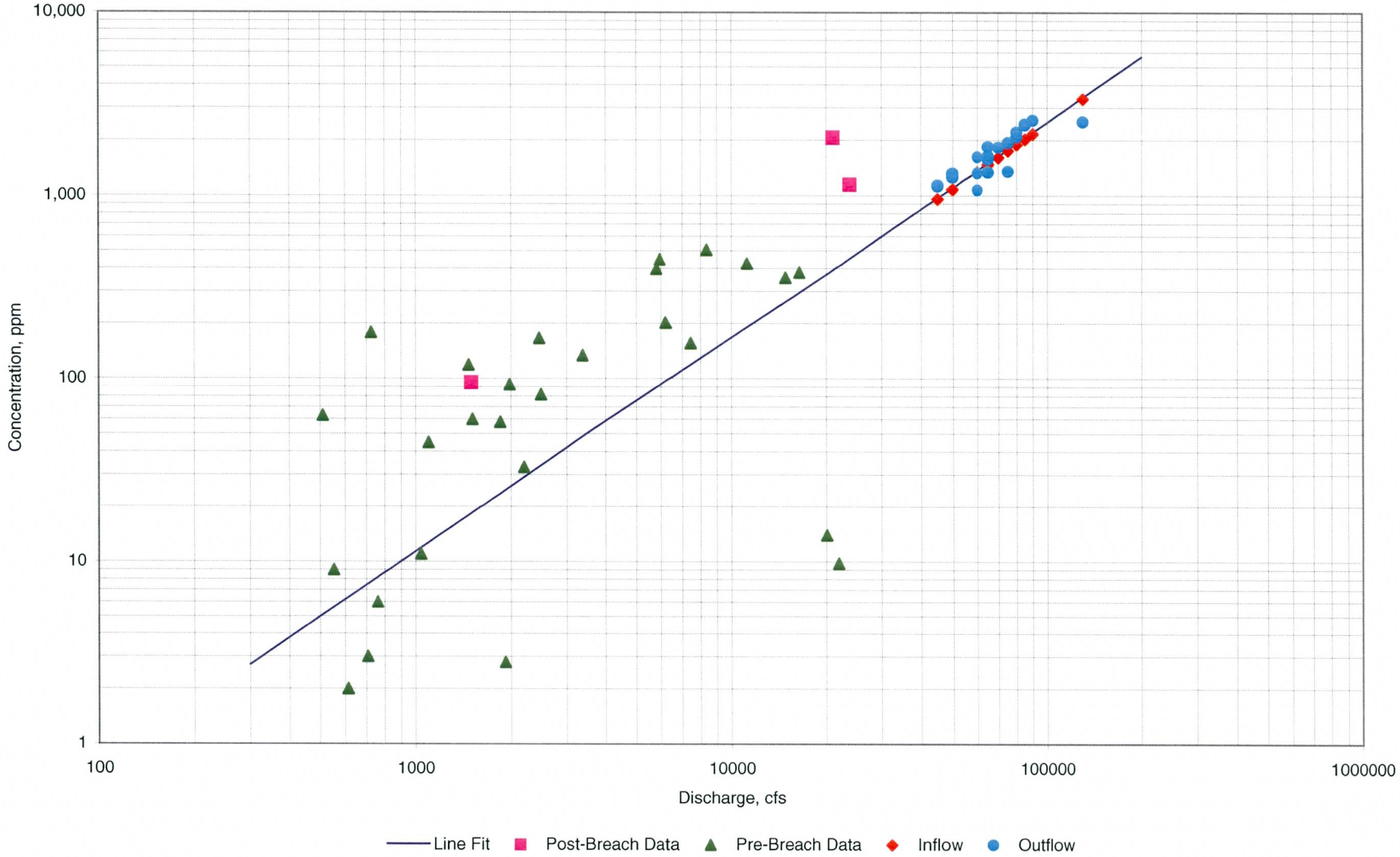


Figure 34
Comparison of Total Load Concentration at Various Discharges

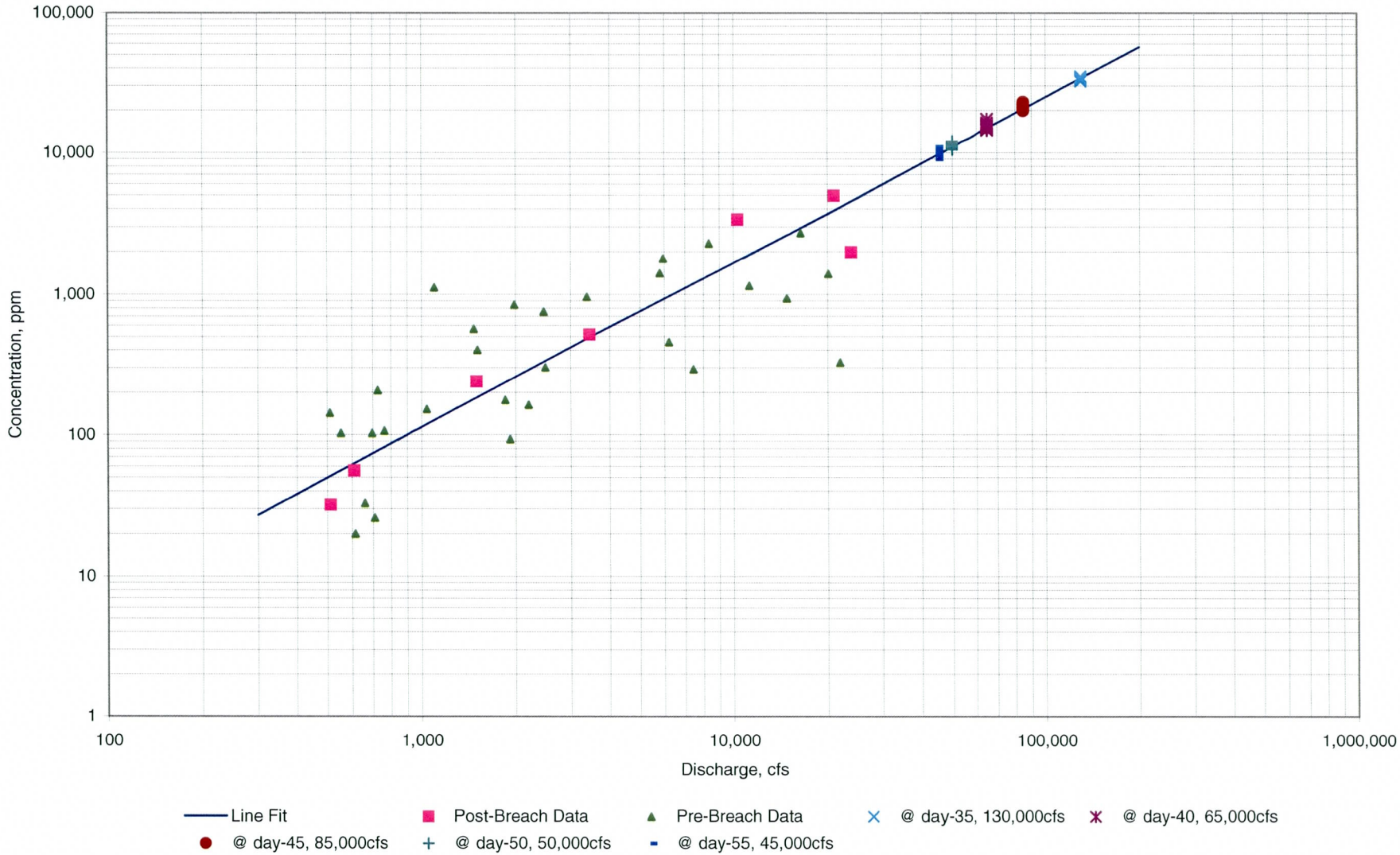


Figure 35
Comparison of Sand Concentration at Various Discharges

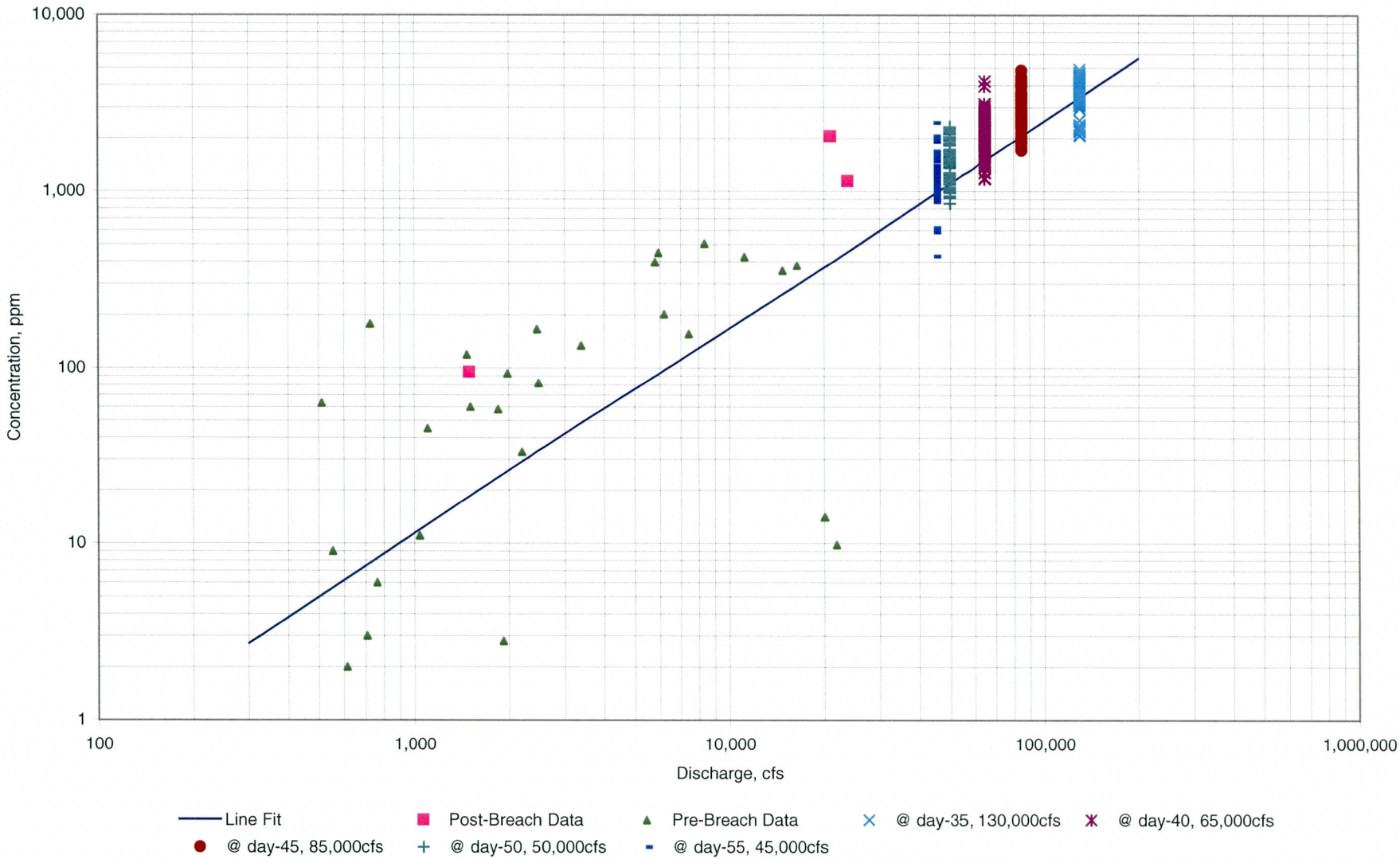


Figure 36
Comparison of Total Load Concentration at Various Cross Sections

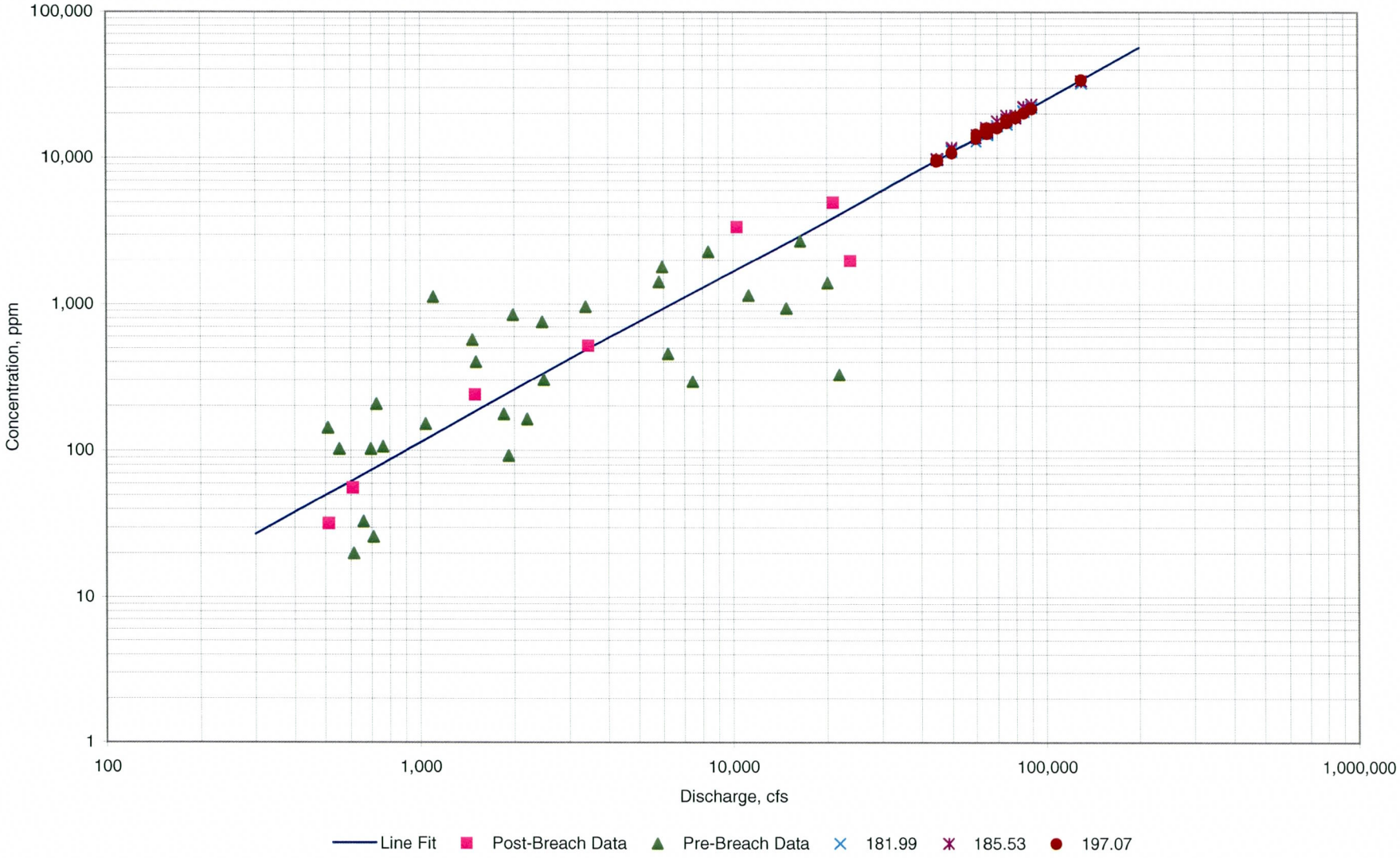
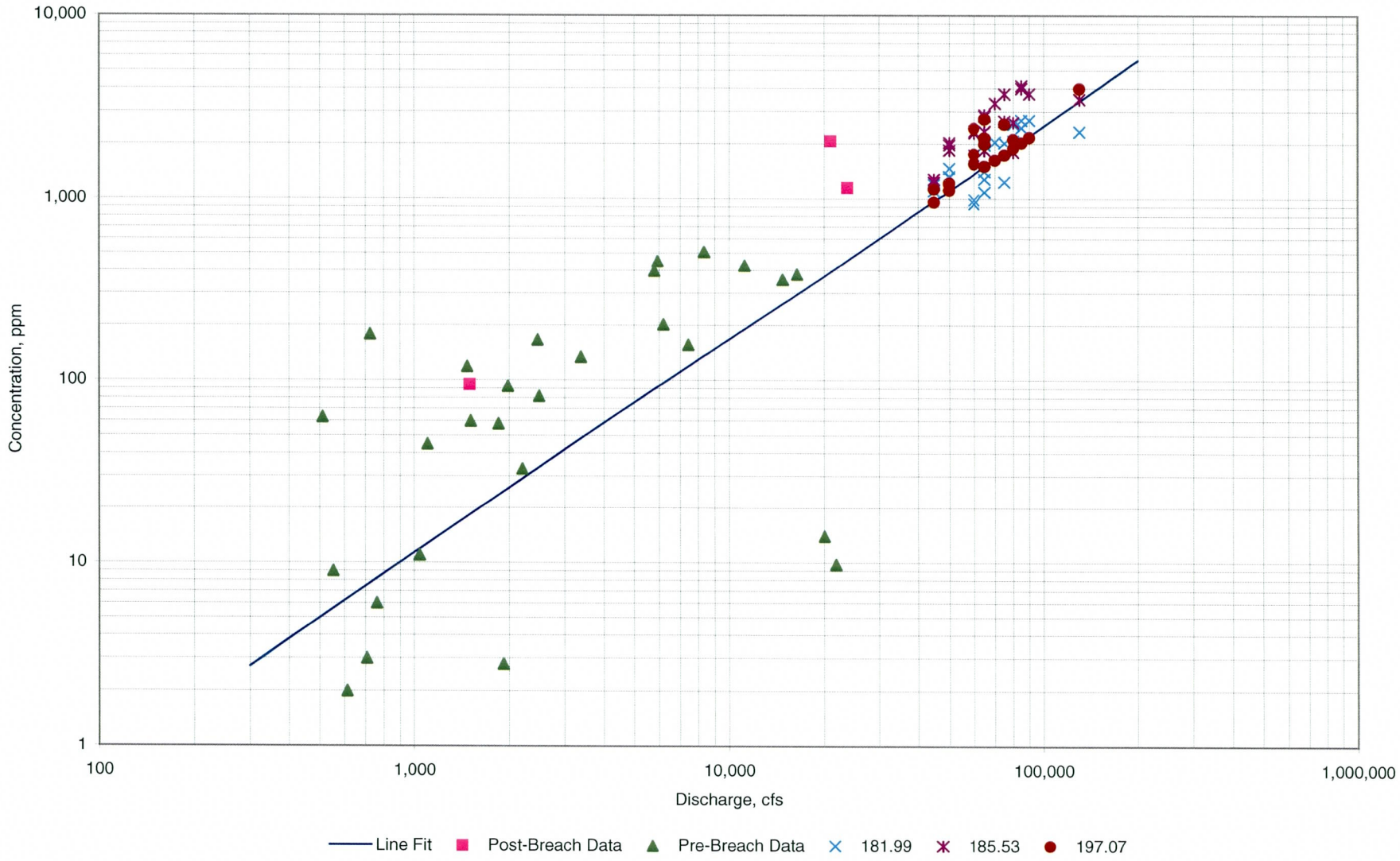


Figure 37
Comparison of Sand Concentration at Various Cross Sections



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DATA COLLECTION

HYDRAULIC AND GEOMETRIC INPUT

The base hydraulic and geometric data utilized in the erosion and sedimentation analyses for the Gila River is taken from an existing study *Salt-Gila River Floodplain Delineation Restudy* by Michael Baker, Jr. Inc., dated May 1999 (Baker, 1999).

SEDIMENT INPUT

Figure 22 shows the location of the sieve-analyzed samples of the bed material. All the samples except Sample 5 and Sample 6 were collected in the main channel of the Gila River. Sample 5 was collected in the main channel of Waterman Wash. Sample 6 was collected in the overbank of the Gila River. AMEC Earth & Environmental, Inc. analyzed the samples and the results are included in Attachment 1.

One pebble count was conducted east of Jackrabbit Road in an area of coarse material. The pebble count data were collect by first laying a tape across the main channel. At each 10-foot interval, the sediment particle directly beneath the tape interval was measured.

During September and October 2002 Stantec conducted field visits to the Gila River study area. Throughout the study reach areas of surface gravel were observed (Figure 23). Shallow holes were dug in the surface gravel and coarse sand with some gravels and cobbles were uncovered (Figure 24). Majority of the material on the river bed consists of medium to very coarse sand. A shallow hole was dug in the sand and more sand was uncovered.

During March 2003 two trenches were dug in the floodplain upstream of State Route 85 and upstream of Miller Road. Soil in the trenches down to groundwater consisted of clays, silts, and fine sands (Figure 25). The trench near State Route 85 was excavated near a Tamarisk bush. The root ball of the tree was approximately two feet below the ground surface, indicating an area of deposition (fill). One trench was dug in the main

channel upstream of State Route 85. The material from the trench consisted of sand with some gravels and cobbles down to groundwater (Figure 26).

HYDROLOGIC INPUT

The development of the base hydrologic data utilized in the erosion and sedimentation analyses is described in the Section Hydrology. It includes the period of record for flows greater than the 10-year event (38,000 cfs) plus the 100-year event.

Figure 23. Surface Gravel in Gila River

Figure 24. Sediment Under Surface Gravel

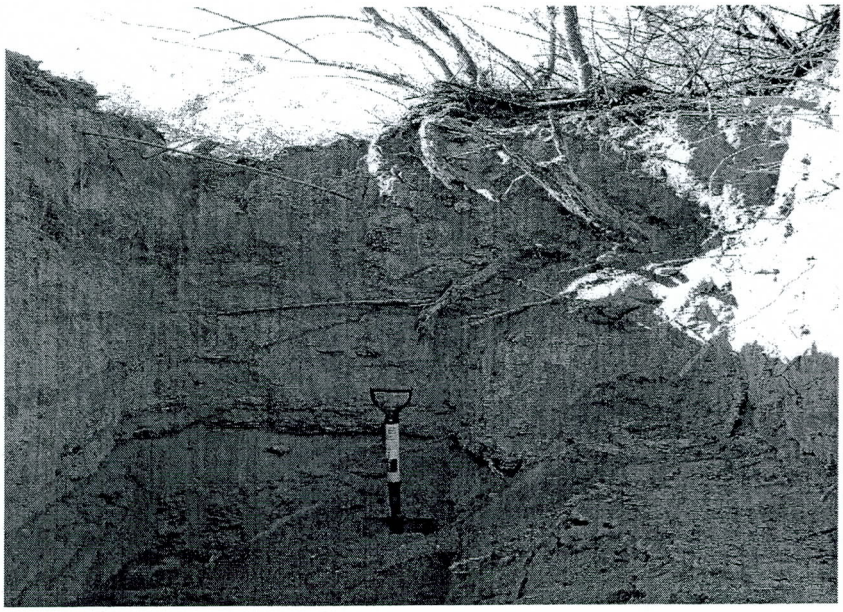

Figure 25. Trench Excavated in Overbank Area

Figure 26. Trench Excavated in Main Channel

HYDROLOGY

Hydrologic input to the HEC-6T model is in the form of a discretized streamflow hydrograph. The hydrologic input is based on mean daily discharges from USGS records for the streamgage located below Gillespie Dam for the period from about August 1921 through September 2001. That gage has been operated for more than 80 years (1921 to present) and represents the "long term" flood history for the study reach. A synthesized 100-year flood hydrograph was added to the end of the hydrologic record. A detailed description of the development of the data is included in the Hydrology and Hydraulic Report. For modeling purposes the hydrologic input was reduced to flows greater than the 10-year flood event (38,000 cfs). Figure 27 shows the shows the discretized hydrologic input. Flow change locations were not included at tributaries, such as Waterman Wash or Agua Fria River, because changes at these locations were considered minor compared to the flow rate in the Gila River. The time step or computational interval for each input was set at 0.05 days (72 minutes).

EROSION AND SEDIMENTATION ANALYSIS

ANALYSIS TECHNIQUE

The erosion and sedimentation of the Gila River within the study area was investigated by modeling the sediment transport through the watercourse for the period of streamflow record plus the 100-year event. The modeling was performed using the HEC-6T model (MBH Software, Inc., 2002). Input to the HEC-6T models was obtained from the hydraulic model (HEC-RAS) of the watercourse, field data collected regarding sediment characteristics, assumptions regarding hydrologic and hydraulic conditions, and the selection of the appropriate sediment transport function.

The models were verified by comparison of measured data near Gillespie Dam (see Section Modeling Verification). Sensitivity of model input was investigated to assess how critical various model inputs and assumptions are to model results. Erosion and sedimentation results are analyzed by evaluation of quantitative results and by the qualitative interpretation of graphical results from the HEC-6T model.

SEDIMENT DATA AND ANALYSIS

General

The sediment data is composed of bed material and inflowing sediment. Bed material is developed from sieve samples obtained in the Gila River channel. The bed material is predominantly composed of sand sizes (0.0625 to 2.0 mm) and some coarser size fractions. Fines (silts and clays) are not included in the model for bed material, because large amounts were not found in the sediment bed reservoir. This material is carried into the channel by the wash load. The wash load is defined by Einstein (1950) to be "all particle sizes that are not significantly represented in the deposit." In general, the material in the channel is sand sized material or larger and is considered part of the bed-material load.

The actual size gradation of the bed material in the floodplain of the Gila River is not represented in the model. A large percentage of the flow and majority of the sediment

transport is occurring within the defined channel. The floodplains consist of dense, mature vegetation (Tamarisk). Sample 6, collected from the floodplain, mostly consisted of fine material, approximately 61 percent. Two trenches were dug in the floodplain upstream of State Route 85 and upstream of Miller Road. The soil in the trenches down to groundwater consisted of clays, silts and fine sands. This indicates that the flow velocity is slow enough for deposition of fine material little or no erosion is taking place.

Inflowing sediment is derived from USGS sediment records and a synthesized inflowing sediment method. The inflowing sediment is modeled as the total load, which includes the wash load and bed-material load. The total load is included in the inflowing sediment because the concentration of fines modifies the properties of the fluid (Colby, 1964). As the concentration of fines increase, the fall velocity of sands decrease. HEC-6T uses the correction factors by Colby (1964) to adjust the transport rate for concentrations of suspended sediment.

Selection of Transport Function

The Yang Stream Power function was selected because it can adequately model the range of sediment found within the Gila River. HEC-6T includes both Yang's sand formula (1973) and gravel formula (1984). The combination of these formulas results in a sediment size range of 0.015 mm to 10 mm. Approximately 99 percent of the bed material of the study area of the Gila River falls within this range.

Bed Material Size Distribution

A series of sieve-analyzed samples from the main channel and one from the overbank were collected as part of the study. The sieve-analyzed samples are shown on Figure 28. No trend of the size distribution of the bed material is detected. Figure 28 indicates the typical variability of alluvial river bed material size gradation. Therefore, a composite of the sieve-analyzed data collected from the main channel was computed using the geometric mean of the grain sizes at various percentages. The grain size at 100 percent was set to 130 mm because this was the largest size sampled in the field. The sieve-analyzed sample collected from the overbank, Sample 6, was not included in the

calculation. The calculated bed-material size gradation curve is shown in Figure 28. That size gradation is used for the entire study reach.

Inflowing Sediment Data

The inflowing sediment was defined for the upper boundary of the watercourse. The inflowing sediment from tributaries, such as Waterman Wash and the Agua Fria River, is considered minor compared to the sediment load in the Gila River and is not a significant component of sediment for this study of the Gila River. The inflowing sediment is coded into the model as a sediment discharge rating curve with three parts, water discharge, total sediment load, and fraction of sediment load for each grain size classification. The water discharge and total sediment load curve was determined using USGS record data. The sediment records for the Gila River above the diversion at Gillespie Dam, AZ (USGS gage 09518000) were obtained. The record was sorted for all discharges greater than 500 cfs. Sediment and water discharge sets for the period after the Gillespie Dam breach (12 January 1993 through 17 February 1995) were plotted. Those values are shown on Figure 29 and listed in Table 1. Only data after the breach is used because the dam and upstream vegetation effected the sediment measurements. The 20-foot high dam was built in 1921. Shortly after the construction the reservoir filled with sediment. The ensuing sediment delta caused a shallower slope and decreased the sediment transport capacity. Also, dense vegetation (Tamarisk) trapped sediment upstream of the dam. A line was fitted to the data in Table 1 by grouping and averaging the four greatest and four smallest sediment and water discharge data. This line is shown on Figure 29. When Gillespie Dam breached the sediment that was trapped behind the dam was eroded and released through the breach of the dam. The amount of sediment that was released due to the breach in the dam is about ten percent of the total sediment load for the 1993 flood. Therefore, the sediment rating curve was reduced by ten percent to account for the increase in sediment load due to the erosion of the sediment delta. That rating curve is shown in Figure 29 as the Adjusted Total Load line.

```
#
# U.S. Geological Survey
# National Water Information System
# Retrieved: 2005-01-21 17:49:01 EST
#
# This file contains published daily mean streamflow data.
#
# Further Descriptions of the dv_cd column can be found at:
# http://waterdata.usgs.gov/nwis/help?codes_help#dv_cd
#
#
# This information includes the following fields:
#
#  agency_cd   Agency Code
#  site_no     USGS station number
#  dv_dt       date of daily mean streamflow
#  dv_va       daily mean streamflow value, in cubic-feet per-second
#  dv_cd       daily mean streamflow value qualification code
#
# Sites in this file include:
#  USGS 09518000 GILA R AB DIVERSIONS AT GILLESPIE DAM AZ.
#
#
```

agency_cd	site_no	dv_dt	dv_va	dv_cd
5s	15s	10d	12n	3s
USGS	09518000	1993-01-01	1160	
USGS	09518000	1993-01-02	7510	
USGS	09518000	1993-01-03	9420	
USGS	09518000	1993-01-04	10100	
USGS	09518000	1993-01-05	12000	
USGS	09518000	1993-01-06	16100	
USGS	09518000	1993-01-07	19600	
USGS	09518000	1993-01-08	27100	
USGS	09518000	1993-01-09	130000	e
USGS	09518000	1993-01-10	60000	e
USGS	09518000	1993-01-11	75000	e
USGS	09518000	1993-01-12	65000	e
USGS	09518000	1993-01-13	60000	e
USGS	09518000	1993-01-14	65000	e
USGS	09518000	1993-01-15	65000	e
USGS	09518000	1993-01-16	80000	e
USGS	09518000	1993-01-17	75000	e
USGS	09518000	1993-01-18	90000	e
USGS	09518000	1993-01-19	85000	e
USGS	09518000	1993-01-20	70000	e
USGS	09518000	1993-01-21	85000	e
USGS	09518000	1993-01-22	80000	e
USGS	09518000	1993-01-23	65000	e
USGS	09518000	1993-01-24	50000	e
USGS	09518000	1993-01-25	45000	e
USGS	09518000	1993-01-26	35000	e
USGS	09518000	1993-01-27	25000	e
USGS	09518000	1993-01-28	20000	e
USGS	09518000	1993-01-29	16000	e
USGS	09518000	1993-01-30	15000	e
USGS	09518000	1993-01-31	14000	e
USGS	09518000	1993-02-01	17000	e
USGS	09518000	1993-02-02	17000	e
USGS	09518000	1993-02-03	16000	e
USGS	09518000	1993-02-04	15000	e

65000 cfs 15000 mg/l
46153 mg/l

Greene

200000 cfs 30000000 ~~tons/day~~ 45000 mg/l

USGS	09518000	1993-02-05	12000	e
USGS	09518000	1993-02-06	12000	e
USGS	09518000	1993-02-07	14000	e
USGS	09518000	1993-02-08	15000	e
USGS	09518000	1993-02-09	20000	e
USGS	09518000	1993-02-10	30000	e
USGS	09518000	1993-02-11	30000	e
USGS	09518000	1993-02-12	30000	e
USGS	09518000	1993-02-13	20000	e
USGS	09518000	1993-02-14	20000	e
USGS	09518000	1993-02-15	20000	e
USGS	09518000	1993-02-16	20000	e
USGS	09518000	1993-02-17	20000	e
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USGS	09518000	1993-02-19	16000	e
USGS	09518000	1993-02-20	35000	e
USGS	09518000	1993-02-21	60000	e
USGS	09518000	1993-02-22	50000	e
USGS	09518000	1993-02-23	50000	e
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USGS	09518000	1993-03-03	21000	
USGS	09518000	1993-03-04	21900	
USGS	09518000	1993-03-05	21500	
USGS	09518000	1993-03-06	24500	
USGS	09518000	1993-03-07	23600	
USGS	09518000	1993-03-08	21800	
USGS	09518000	1993-03-09	17500	
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USGS	09518000	1993-03-12	3990	
USGS	09518000	1993-03-13	3500	
USGS	09518000	1993-03-14	5860	
USGS	09518000	1993-03-15	6160	
USGS	09518000	1993-03-16	7120	
USGS	09518000	1993-03-17	7470	
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USGS	09518000	1993-03-20	8750	
USGS	09518000	1993-03-21	8240	
USGS	09518000	1993-03-22	8900	
USGS	09518000	1993-03-23	9860	
USGS	09518000	1993-03-24	10100	
USGS	09518000	1993-03-25	9080	
USGS	09518000	1993-03-26	9420	
USGS	09518000	1993-03-27	9460	
USGS	09518000	1993-03-28	10400	
USGS	09518000	1993-03-29	10600	
USGS	09518000	1993-03-30	10300	
USGS	09518000	1993-03-31	10500	
USGS	09518000	1993-04-01	12400	

Attachment 5:

CD of Base HEC-6T Model