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ENVIRONMENTAL ENGINEERS • DESIGNERS • SCIENTISTS

TECHNICAL MEMORANDUM

CITY OF AMARILLO
MARTIN ROAD LAKE
Storm Water Master Plan Project
Flooding Mitigation Conceptual Evaluation Memo Phase 2

Project No.: 0458-022-01

Date: November 21, 2013

Prepared For: Mark Read, PE, City Engineer

Prepared By: George Farah, PE
Adam Rose, PE, CFM

cc: file

George I. Farah
11/27/2013

INTRODUCTION:

This memo describes several options for the lowering of the floodplain of Martin Road Lake in the City of Amarillo. The lake is in the northeast quadrant of the City and is located north of Interstate 40 and east of Highway 434. The lake has two parts, separated by Martin Road. The east portion of the lake is shallower than the western portion. The two sections are connected by a several box culverts beneath Martin Road. The hydraulic modeling of the floodplain and the findings of the ASAPP modeling are discussed in a separate memorandum. This technical memorandum will refine project concept and update construction cost based on the comments from various city departments.

BACKGROUND:

The City Council has recently authorized the collection of a storm water fee. This fee is collected to fund storm water and drainage improvement. The City has identified Martin Road Lake as one of the top-priority projects due to the frequent usage of the lake shore by residents and the high floodplain, which puts a large amount of homes and business in high risk of flood damage. The lake is a playa lake which is used for storm water retention (Aerial Photo 1). The storm water is pumped to another playa lake in the City. This pumped flow is the only outfall. There are at least seven points of concentrated flow into the lake and several sheet flow inflows. Alan Plummer Associates, Inc. (APAI) was selected to calculate the floodplain elevation and prepare budgeting costs for the alternative improvements that could lower the floodplain. APAI and the City had a meeting to discuss the options described in the Technical Memorandum submitted to the City dated April 15, 2013. The City selected option 2a which is to lower

the flood plain by 1 foot. APAI proceeded to further refine the flood model and identified that the model was not responding correctly to the volumetric changes to the pond. APAI discusses this discrepancy with the City and identified that it may be necessary to perform the model using HEC-HMS. APAI proceeded to model the flood condition using HEC-HMS and identified that the existing 100-yr. water surface elevation is 3629.5.

APAI proceeded to identify options for excavation that would remove all structured from the flood Plain and lower it to elevation 3625.00. This would be accomplished by excavating the east lake down to elevation 3586 and expanding the lake's footprint. The east lake's slopes would be excavated to a 4H:1V slopes. The west lake would also be excavated to have a 4H:1V slopes and would have a larger foot print expanded to the south, east and north. These changes accommodate the existing park features, such as picnic tables, parking lots, and play areas. The proposed conceptual excavation limits and the excavation cross sections of each lake are attached to this memo (Figures 1-6)

It is estimated that the volume of excavation necessary to remove all structures from the 100-year flood plain is 380,000 cubic yards.

Aerial Photo 1

CONSTRUCTION COST

Based on discussion with the City Staff, it is assumed that the excavated material from this site could be disposed of at the City of Amarillo old landfill located northeast of the intersection of Hazel Avenue and Echo Street. The site is approximately two miles north of Martin Road Lake and its proximity would reduce excavated material trucking and disposal costs. The conceptual design would necessitate installing a connector between the east lake and the west lake at an elevation allowing the east pond to drain to the west, especially since the east pond will be excavated 26 feet. Table 1 shows the conceptual construction costs for the proposed changes at this site.

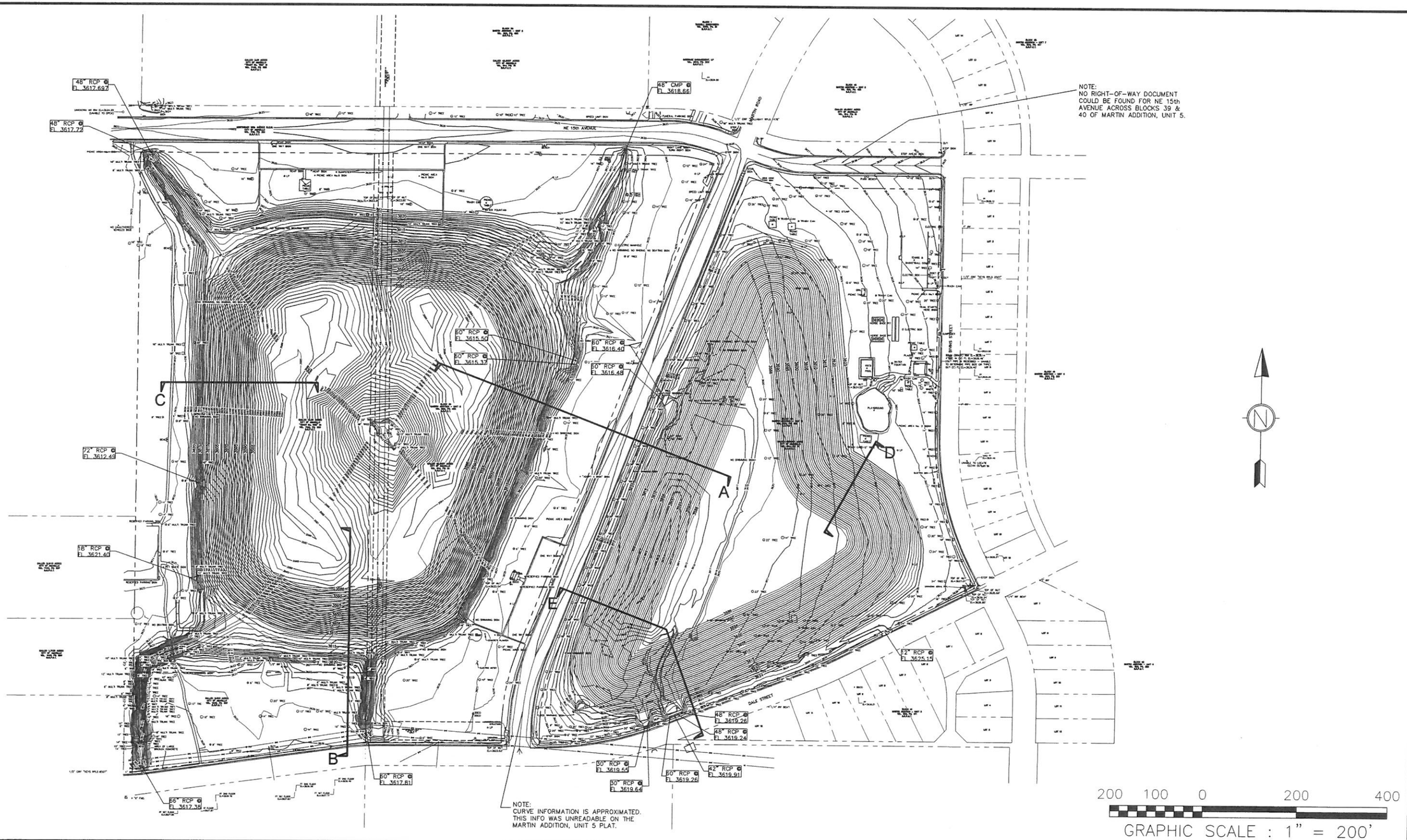
TABLE 1

Item No.	Description	Quantity	Unit	Unit Price	Total Price[1]
1	Excavation	380,000	Cyd	$ 9	$ 3,420,000
2	30-Inch RCP pipe	80	LF	$ 75	$ 6,000
3	Headwalls for 30-inch Pipe	2	EA	$ 2,500	$ 5,000
4	Adjustments of Existing Headwalls	8	EA	$ 8,000	$ 64,000
5	Sidewalk Repairs	200	LF	$ 25	$ 5,000
6	Concrete Flume Repairs	40	LF	$ 45	$ 1,800
7	Storm water Management Plan	1	LS	$ 10,000	$ 10,000
8	Irrigation Repairs	1	LS	$ 15,000	$ 15,000
9	Riprap	45	Cyd	$ 95	$ 4,275
10	Traffic Control Plan	1	LS	$ 10,000	$ 10,000
11	Force Main Connection to Pump	1	LS	$ 5,000	$ 5,000
12	FM to Drain West Lake	1100	LF	$ 200	$ 220,000
13	Trash Collection Trap at outfalls	6	Ea	$ 12,000	$ 72,000
				Subtotal	**$ 3,838,075**
11	Contingency (30%)	1	LS		$ 1,151,423
				Total Construction Cost	**$ 4,989,498**

[1] The total price does not include any backfill or piping of the channels in the west portion of the lake. That cost is discussed in another memorandum.

RECOMMENDATIONS:

Based on the HMS model and the engineering analysis described in this memo, the recommended design option is to excavate the lake to lower the 100-year flood elevation below 3625 feet. It is also recommended that the City request a letter of Map revisions from FEMA, once the design is complete, to revise the flood plain of Martin Road Lake.



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CITY OF AMARILLO
MARTIN ROAD LAKE
STORM WATER MASTER PLAN PROJECT
FLOODING MITIGATION
CONCEPTUAL EVALUATION

OCTOBER, 2013

APAI PROJ.# 458-022-01
AMARILLO PROJ.# XXXXXX

MARTIN ROAD LAKE
FIGURE 1
AREA PLAN

REFERENCES:
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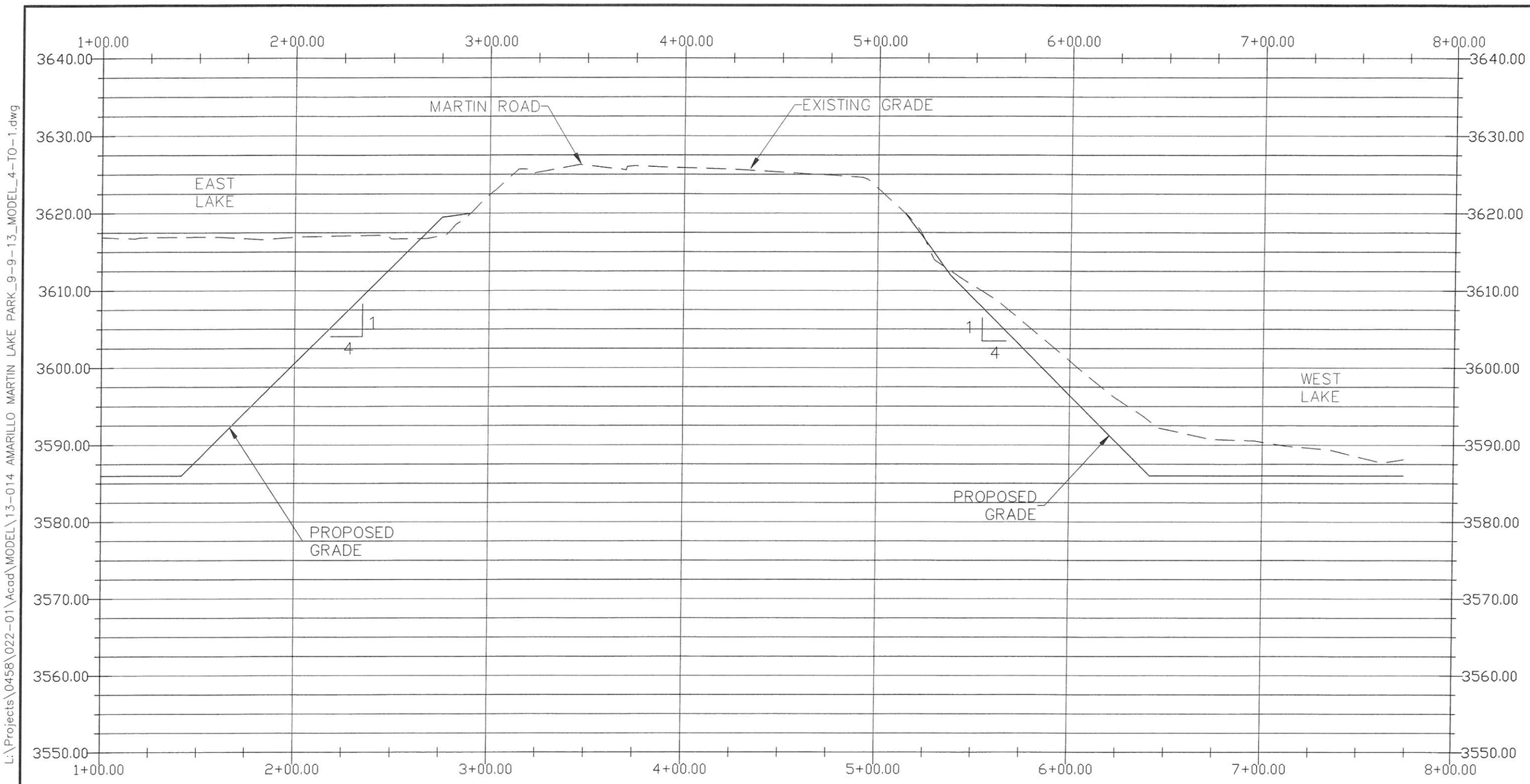

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HORIZ. SCALE : 1" = 50'

10 5 0 10 20

VERT. SCALE : 1" = 10'

BAR IS ONE HALF INCH IN LENGTH ON ORIGINAL DRAWING. CHECK SCALE AND ADJUST ACCORDINGLY.

ONE HALF INCH

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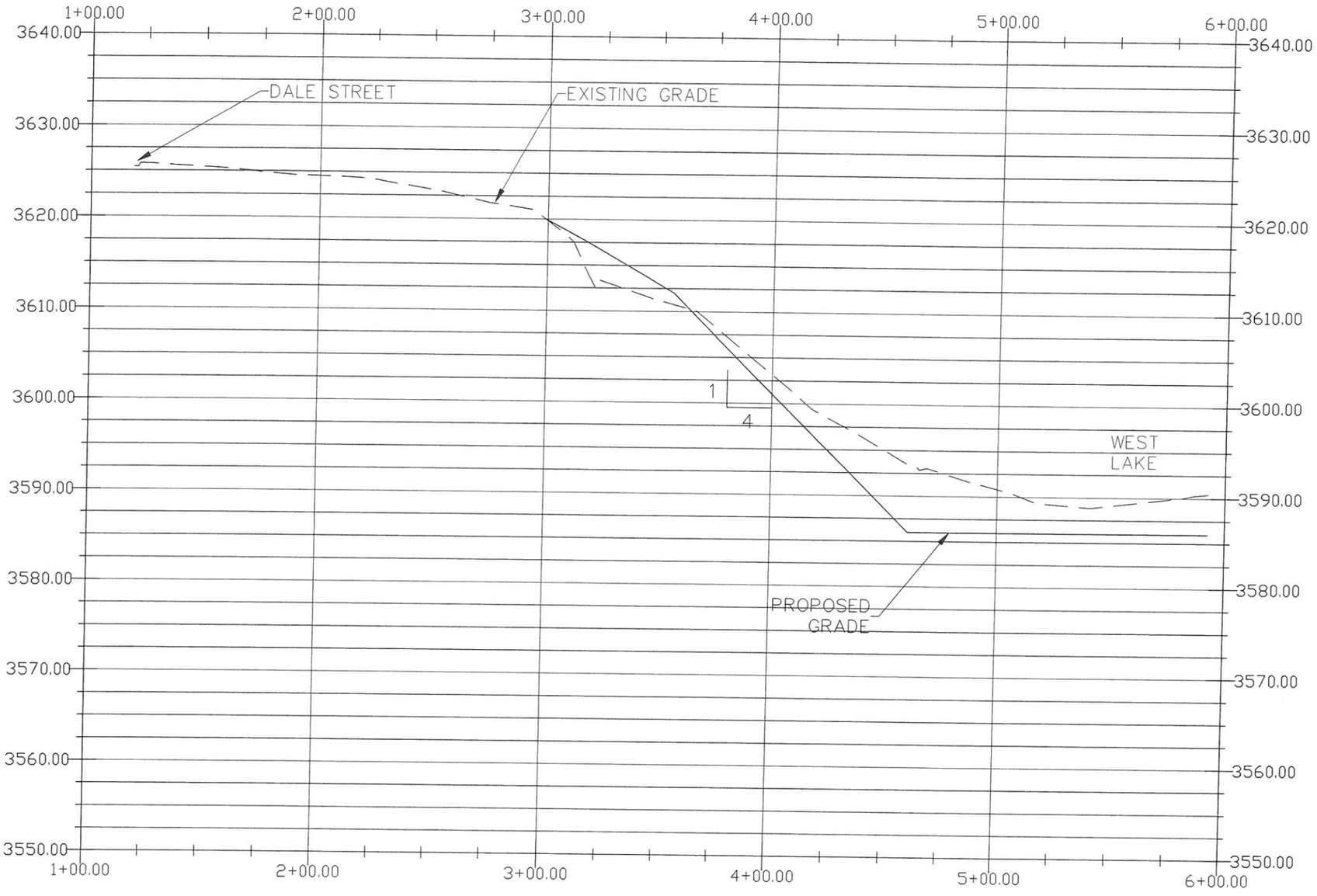
MARTIN ROAD LAKE
FIGURE 2
SECTION A



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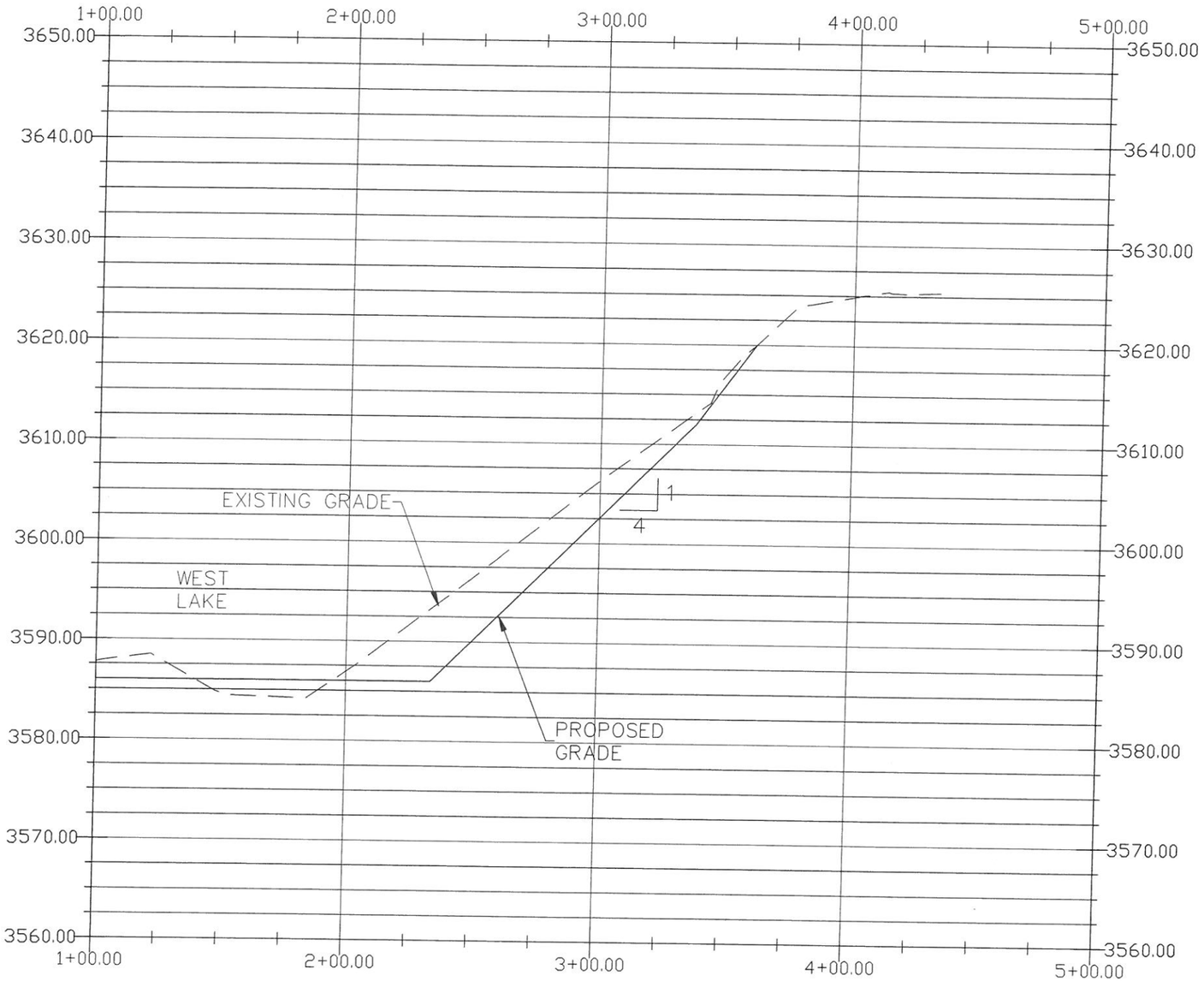
MARTIN ROAD LAKE
FIGURE 3
SECTION B



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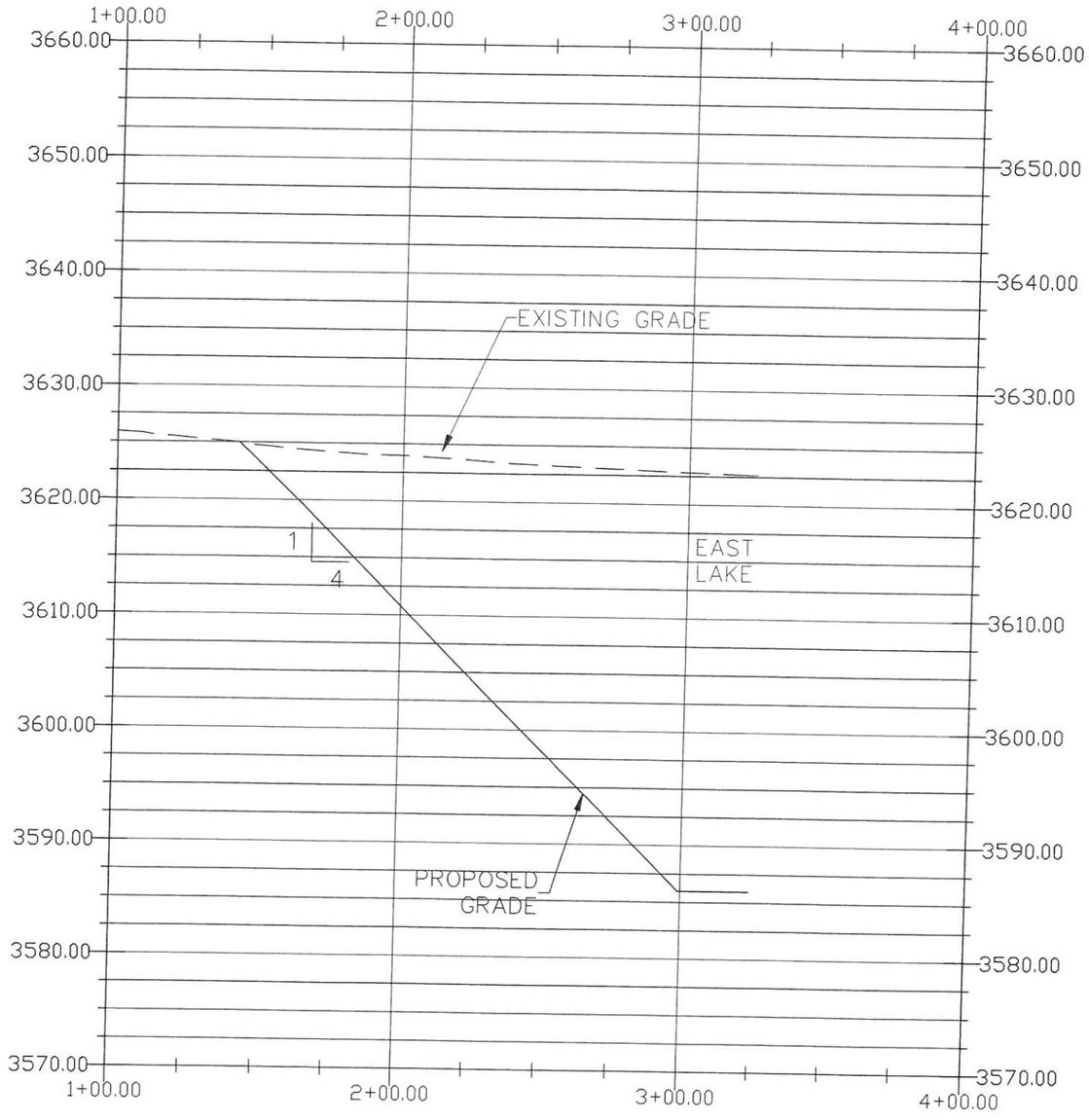
MARTIN ROAD LAKE
FIGURE 4
SECTION C



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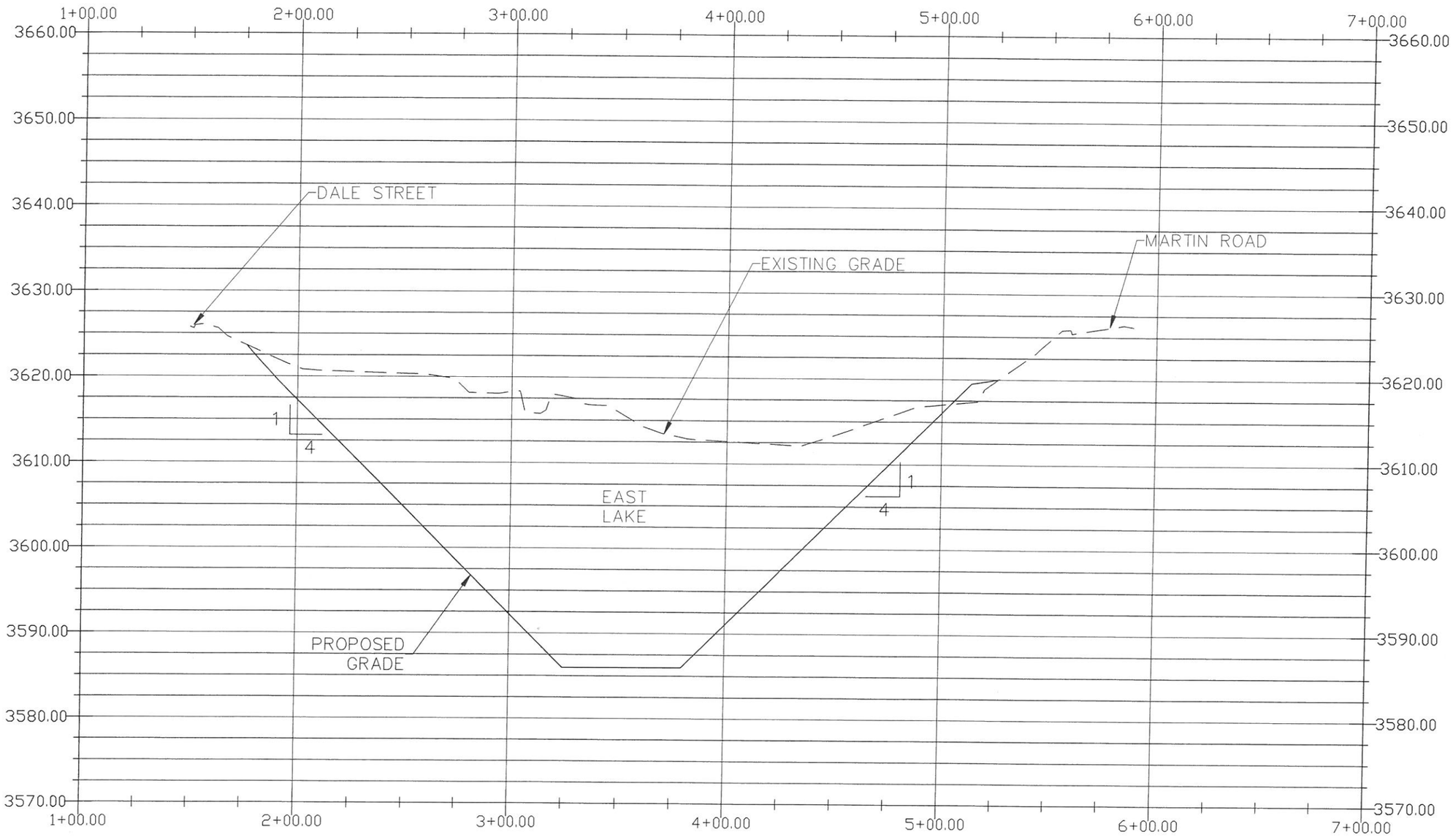
MARTIN ROAD LAKE
FIGURE 5
SECTION D



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MARTIN ROAD LAKE
FIGURE 6
SECTION E