

## Memorandum

**To:** Bassett Creek Watershed Management Commission  
**From:** Barr Engineering Co.  
**Subject:** Item 5A – Consider Approval of 90% Design Plans for Plymouth Creek Restoration Project, Annapolis Lane through Plymouth Creek Park (CIP 2017CR-P), Plymouth  
**Date:** July 13, 2017  
**Project:** 23270512017 635

### 5A. Consider Approval of 90% Design Plans for Plymouth Creek Restoration Project, Annapolis Lane through Plymouth Creek Park (CIP 2017CR-P), Plymouth

#### Summary

**Proposed Work:** 2017 Plymouth Creek Restoration Project (CIP 2017CR-P)

**Basis for Commission Review:** 90% plan review

**Change in Impervious Surface:** N.A.

**Recommendation:** Conditional Approval

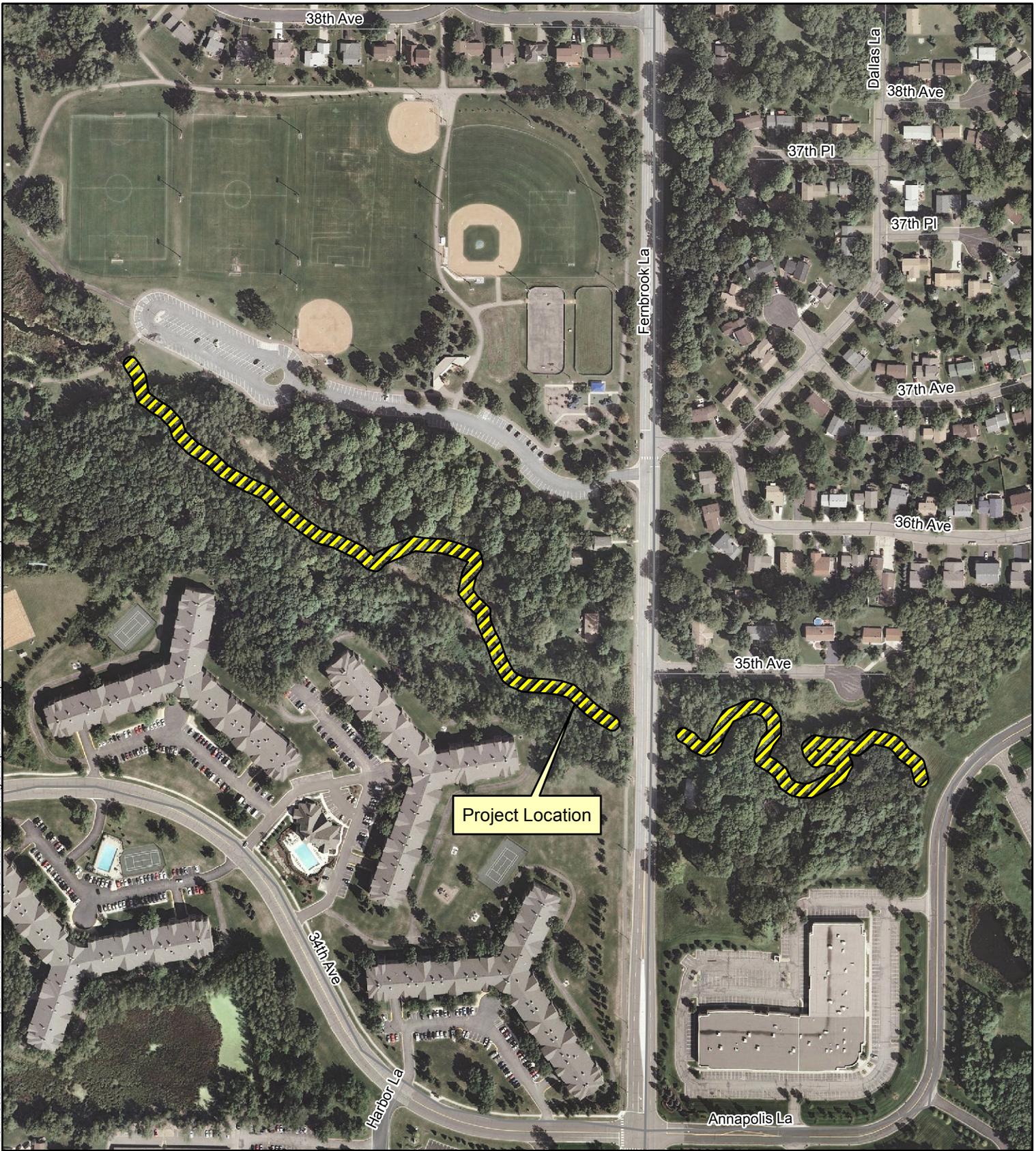
The 2017 Plymouth Creek Restoration project (CIP 2017CR-P) is being funded by the BCWMC's ad valorem levy (via Hennepin County). The City of Plymouth provided the 90% design plans to the BCWMC for review and comment, as set forth in the BCWMC CIP project flow chart developed by the TAC.

#### Feasibility Study Summary

The BCWMC completed the 2017 Plymouth Creek Restoration Project Feasibility Report (Barr, March 2016) to examine the feasibility of restoring sites along the 2,500-foot reach of the creek in Plymouth Creek Park and between Fernbrook Lane North and Annapolis Lane North (Figure 1). The feasibility report identified 21 sites where bank erosion, bank failure, and infrastructure repairs were needed, in addition to removal of debris and fallen trees.

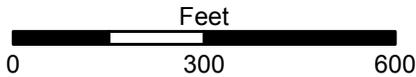
The feasibility report identified 2-4 design options for each site and a final recommendation for each site. For most sites, the feasibility report included two alternative designs: 1) a bioengineering (or soft armoring) approach that uses techniques that rely primarily on vegetation; 2) a more structural (or hard armoring) approach that uses rock and other non-vegetative materials. Some sites included additional alternatives that did not focus on preserving the existing alignment or channel configuration, such as remeandering the channel or reconnecting to the floodplain. Recommendations, based on site-specific

Barr Footer: ArcGIS 10.4.1, 2017-06-07 11:21 File: I:\Client\BassettCreek\gis\maps\Permits\Maps-2017\2017CR-P.mxd User: jrv



Imagery Source: Aerial Express (2009)

-  Project Location
-  Bassett Creek
-  WMC Boundary
-  Major Subwatershed
-  Municipality
-  Stream



**LOCATION MAP  
APPLICATION 2017CR-P  
Plymouth Creek Stream  
Restoration Project  
Plymouth, MN**

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considerations, included a mix of hard and soft armoring approaches, and additional alternatives to realign the channel.

The feasibility report estimated that this restoration project would require the removal of approximately 100-150 trees and estimated that project implementation would reduce the total phosphorus load by 52 pounds per year and the total suspended sediment load by 90,800 pounds per year.

## **Project Summary**

The 90% design plans follow many of the recommendations from the feasibility study and include the use of root wads, log vanes, rock/cross vanes, debris clearing and vegetation management. The plans also include the use of vegetated riprap and specific measures to improve the disc golf course adjacent to the creek in Plymouth Creek Park. Measures to improve the disc golf course include a low flow crossing where it was observed that golfers are frequently retrieving discs; disc stop poles to prevent discs from damaging trees and going into the creek; installation of boardwalk sections; and improvements to greens to improve erosion control.

The plans differ from the feasibility recommendations in a few areas, primarily involving the use of hard armoring slightly more than the feasibility recommendations. A concise summary of the differences between the design plans and the feasibility study was provided in the 60% design review.

Temporary and permanent erosion and sediment control measures include:

- Rock construction entrances
- Silt fence
- Inlet protection
- Bioroll
- Floating silt curtain
- Erosion control blanket
- Seeding

The plans show the removal of approximately 83 trees over the project length, with up to 26 additional trees identified as “to be harvested as needed” for re-use on the project.

## **Previous Reviews**

The City of Plymouth submitted the 60% design plans for this project and the BCWMC conditionally approved the 60% plans at its June 15, 2017 meeting. Following the conditional approval of the 60% design plans, the City of Plymouth revised the design drawings to the 90% level with the inclusion of the comments from the BCWMC’s 60% review comments. On June 30<sup>th</sup>, 2017, the City of Plymouth provided the 90% design plans that included advancement of the design and addressed the BCWMC’s comments

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provided on the 60% submittal. The Commission Engineer reviewed the 90% design submittal as well as the responses to the 60% design comments. The 90% design drawings sufficiently address the majority of the BCWMC Engineer's comments provided as part of the review of the preliminary 60% plans.

However, the 90% plans do not sufficiently address the BCWMC Engineer's comment requiring no change in the flood level resulting from the proposed design. The modeling results provided with the 90% plans show a 0.1 – 0.3 foot increase in the modeled flood elevation upstream of Fernbrook Lane, including the private property at 3535 Fernbrook Lane N and 3450 Fernbrook Lane N. The plans must be revised and/or the modeling refined to show that there will be no increase in the flood level. The City's consultant (Wenck) is working on this and may provide additional information/design changes to the Commission Engineer for their review before the Commission meeting.

The Commission Engineer's 60% design comment letter also requested the following additional information (Wenck June 30<sup>th</sup> responses and the Commission Engineer's comments are noted):

1. Estimated pollutant removals, compared to pollutant removals estimated in feasibility study

**Wenck response:**

From the feasibility study:

"The estimated total sediment load from bank erosion is calculated using the approximate dimensions of the eroding stream banks at each site. The effects of stabilization alternatives on water quality are estimated based on the assumption that each stabilization alternative successfully addresses erosion at the site and brings erosion to a low rate, representative of a stable stream in this geologic setting. The total reduction in pollutant loading as a result of the project is estimated as 90,800 pounds per year total suspended sediment and 52.2 pounds per year total phosphorus. The majority of this load reduction will be achieved by stabilizing the eroding banks in Reaches 2 and 3."

Since our project proposes to stabilize the same areas identified in the feasibility study with similar practices that addresses erosion at the site we propose that estimated pollutant removals will be similar to the feasibility study.

**Commission Engineer comment:**

We concur.

2. Educational signage in park/disc golf course

**Wenck response:**

The sign pictured below was completed, along with several others, by a Girl Scout working on her Gold Award. These signs were done for the previous Elm Creek restoration project done by the City of Plymouth and turned out as nice as a professionally designed sign for the cost of printing and materials. The City is willing to work with Bassett Creek Watershed Management Commission

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and a future Gold Award candidate on completing signage for the Plymouth Creek restoration project. The challenge is in timing; when another girl scout contacts the City seeking a project.



**Commission Engineer comment:**

The City's proposed approach is a good idea, but without a Girl Scout lined up to work on the sign, it could be some time after project completion before a sign is installed.

3. Table and/or graphic showing golf course-related project components and costs vs. other restoration features and costs

**Wenck response:**

A construction cost estimate is attached showing a breakdown of course-related project costs versus stream restoration costs.

**Commission Engineer comment:**

The cost estimate is attached to this memo.

4. Tree survey results

**Wenck response:**

The appendix of surveyed trees indicating which trees are selected for removal and trees that are available for harvest as needed to supply addition rootwads and footer logs as needed is attached. This appendix will be included with the project specification manual.

**Commission Engineer comment:**

Trees to be removed (83 noted in tree survey) include American elm, basswood, bitternut hickory, black cherry, black willow, box elder, cottonwood, green ash, red oak, and sugar maple. Trees to be harvested, if needed (26 noted in tree survey), include American elm, basswood, black cherry, black willow, box elder, green ash, quaking aspen, red oak, sugar maple, and white oak. In follow-up communication with Wenck staff, we learned that 57 larger-diameter trees (10-inch diameter or larger) are needed for the project (used in restoration measures); 53 of the trees to be removed fit this criteria, so an additional four trees will need to be removed for use in the project. The four trees would be selected from the "harvest if needed" trees in the tree survey.

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There are discrepancies between trees listed as “remove” trees on the tree survey and the tree removals indicated by “X’s” on the plans (for instance, a 25 inch DBH red oak, #161 is slated for removal in the survey but is not “X’ed” in the plans; the same situation holds for a box elder #162). The information in the tree survey and on the plan sheets must be reviewed for discrepancies and corrected as needed.

The tree survey is included in the electronic packet.

The Commission Engineer’s 60% design comment letter also requested information about the June 26th public open house and/or outreach to disc golfers. Wenck’s response noted that the public open house had seven attendees. Five attendees were from the Park Place Apartments; they had questions pertaining to the water level of the wetland upstream of the project. Two attendees were from 3450 Fernbrook Ln N. (John & Jeanne Starr); they had concerns about 1) the steep slope of their property that leads into the creek, and whether the project would address the overall slope stability; and 2) the conservation area on an adjacent property and whether that prevents removal of trees.

The Starrs subsequently contacted Plymouth staff and the Commission Administrator, expressing their above concerns, plus concerns about tree removal, especially the “old growth” trees in the conservation easement. (See documents in 5Aiii.) The Commission legal counsel reviewed the agreement between the developer and adjacent property owners (including the Starrs) and found that the covenants the developer placed on the property (the conservation area) do not limit the right of the city to use the drainage and utility easement areas dedicated to the public in the plat. Covenants are private limitations placed on the use of property that can address a wide range of issues. The city is not bound by those restrictions and plays no role in enforcing them. The recording of the plat conveyed easements to the city to carry out the purposes for which the particular areas were dedicated. The Commission legal counsel believes the proposed Plymouth Creek project fits squarely within the scope of a platted drainage easement. In short, although the Commission should work to minimize disturbances to the natural area, the agreement is between the property owners and the developer and does not limit the right of the city to use the drainage and utility easement areas.

Many of the trees slated for removal in this area north of the Starr property may not require removal (see relatively flat area south of the creek on sheet C-103) because 1) the trees are not located in an actively eroding area; 2) the trees are located in a conservation area; and 3) the stream restoration measures in the area (vegetated riprap) may not require the additional sunlight.

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## Recommendations

- A. Authorize BCWMC Engineer to provide administrative approval after final plans have been revised and comments have been sufficiently addressed.
- B. Conditional approval of 90% drawings based on the following comments:
  1. Modeling or other documentation must be submitted to verify no change in the flood level caused by the proposed design.
  2. Construction limits on the plan sheets should be shown, including all access routes to (and between) stabilization areas.
  3. The information in the tree survey and on the plan sheets must be reviewed for discrepancies and corrected as needed.
  4. We recommend that the following trees not be removed: #495, 499, 501-505, and 509 (shown on sheet C-103 and called out in tree survey).
  5. A stilling basin downstream of the Fernbrook Lane culvert calls for Class III riprap but the detail on sheet D-104 calls for Class IV. The appropriate riprap size should be verified and the plan sheets modified accordingly.
  6. The erosion and sediment control plans show installation of erosion control blanket only after final grading. We recommend using additional erosion control measures (e.g., compost logs) during construction on the banks and along the stream side of access routes to provide additional erosion control prior to final stabilization.
  7. Temporary vegetative cover must be spread at 1.5 times the usual rate per acre. If temporary cover is to remain in place beyond the present growing season, two-thirds of the seed mix shall be composed of perennial grasses.
  8. Educational signage in the park/disc golf course must be provided/installed before the city receives final reimbursement for the project.
  9. The final plans must be submitted to the BCWMC Engineer for review and approval after modifications have been completed.

PLYMOUTH CREEK STREAM RESTORATION  
CITY PROJECT NO. 16007  
90% ENGINEERS ESTIMATE  
June 30, 2017

Disc Golf Course Improvement for  
Stream Stabilization                      Stabilization

Bid Item	Description	Units	Unit Price	Quantity	Extension	Quantity	Extension
<b>BASE BID - Fall/Winter 2017/2018 Construction</b>							
1	Fall/Winter Mobilization and Demobilization	LS	\$35,000.00	1	\$35,000.00	0	\$0.00
2	Tree Clearing & Harvesting	LS	\$25,000.00	1	\$25,000.00	0	\$0.00
3	Chip Onsite and Spread Woodchips on Existing Trails & Course Greens	LS	\$15,000.00	1	\$15,000.00	0	\$0.00
4	Haul and Dispose Offsite All Unchipped Wood	LS	\$15,000.00	1	\$15,000.00	0	\$0.00
5	Remove and Dispose of 12" RCP Flared End Section	EA	\$250.00	1	\$250.00	0	\$0.00
6	Remove 12" RCP Pipe	LF	\$10.00	40	\$400.00	0	\$0.00
7	Furnish and Install 12" RCP Flared End Section	EA	\$1,000.00	1	\$1,000.00	0	\$0.00
8	New Tie Rod Installation	LS	\$1,000.00	1	\$1,000.00	0	\$0.00
9	Construct, Maintain, & Restore Site Access and Staging Areas	LS	\$15,000.00	1	\$15,000.00	0	\$0.00
10	Woven ECB, Rolanka BioD-Mat 40	SY	\$6.00	3310	\$19,860.00	0	\$0.00
11	Non-Woven ECB Cat 3 Type Straw 2S (No Poly Netting)	SY	\$3.00	3310	\$9,930.00	0	\$0.00
12	Footer Log & Log Vanes	EA	\$50.00	52	\$2,600.00	0	\$0.00
13	Root Wad	EA	\$350.00	57	\$19,950.00	0	\$0.00
14	Seating Log	EA	\$450.00	0	\$0.00	5	\$2,250.00
15	Silt Fence, Type MS - Maintained	LF	\$4.00	400	\$1,600.00	0	\$0.00
16	Flotation Silt Curtain Type Moving Water - Maintained	LF	\$35.00	50	\$1,750.00	0	\$0.00
17	Sediment Control Log Type Straw (Or Bioroll) - Maintained	LF	\$6.00	200	\$1,200.00	0	\$0.00
18	Inlet Protection - Maintained	EA	\$500.00	5	\$2,500.00	0	\$0.00
19	Temporary Construction Entrance - Maintained	EA	\$2,500.00	4	\$10,000.00	0	\$0.00
20	Street Sweeper (With Pickup Broom)	HR	\$125.00	20	\$2,500.00	0	\$0.00
21	Temporary Sedimentation Basin - Maintained	LS	\$2,500.00	1	\$2,500.00	0	\$0.00
22	Cross Vane (No Limestone)	TON	\$125.00	150	\$18,750.00	0	\$0.00
23	Class II Riprap, No Limestone (Veg Riprap Toe, Swales & Brush Mattress)	TON	\$125.00	740	\$92,500.00	0	\$0.00
24	Class III Riprap, No Limestone (Channel Overflow & Plunge Pools)	TON	\$125.00	225	\$28,125.00	0	\$0.00
25	MN DOT Type V, Non-Woven Geotextile Fabric	SY	\$5.00	1780	\$8,900.00	210	\$1,050.00
26	24" to 36" Fieldstone Boulders	TON	\$150.00	45	\$6,750.00	70	\$10,500.00
27	Brush Mattress	SY	\$65.00	30	\$1,950.00	0	\$0.00
28	CU Structural Soils	TON	\$110.00	0	\$0.00	60	\$6,600.00
29	Common Excavation - On-site (EV)	CY	\$15.00	0	\$0.00	200	\$3,000.00
30	Subgrade Preparation	SY	\$15.00	0	\$0.00	100	\$1,500.00
31	Granite Charcoal Stepper	EA	\$500.00	0	\$0.00	8	\$4,000.00
32	Trap Rock Step	EA	\$500.00	0	\$0.00	68	\$34,000.00
33	Aggregate Base CL 5	TON	\$45.00	0	\$0.00	20	\$900.00
34	Aggregate Base CL 2	TON	\$35.00	0	\$0.00	45	\$1,575.00
35	Grass Pave2	SY	\$40.00	0	\$0.00	125	\$5,000.00
36	Disc Stop Poles	EA	\$750.00	0	\$0.00	132	\$99,000.00
37	Timber Edge Path	LF	\$50.00	0	\$0.00	270	\$13,500.00
38	Woodchip or Gravel, If not reusing from tree removal	CY	\$75.00	0	\$0.00	110	\$8,250.00
39	Boardwalk	LF	\$150.00	0	\$0.00	155	\$23,250.00
40	4" Drain Tile Pipe	LF	\$30.00	0	\$0.00	155	\$4,650.00

