

*Guide for Plant Appraisal, 10<sup>th</sup> Edition (Second Printing)*◇  
Worksheets That Don't Work□

P.84. Repair Method – Direct Cost Technique

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None Reproduction Method – Direct Cost Technique

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None Functional Replacement Method – Direct Cost Technique

Sheet 11	Overview
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◇ All page references are to *Guide for Plant Appraisal, 10th Edition* (second printing), unless otherwise noted.

□ Viewing & Printing. View this analysis on-screen, or print in color at 11 x 17 inches.

## Repair [Cost] Method – Direct Cost Technique

The **Repair [Cost] Method** is described on p.55 and this **Worksheet** is on p.84.

P.55 “Repair cost is used when there is damage to a plant or other landscape feature and the assignment focuses on correcting the damage or mitigating the losses. Application requires two assumptions: 1) the item will remain in place; and, 2) it will continue to provide benefits similar to those prior to damage.”

Thus, because the Repair Method addresses partial (rather than total) damage or loss, the Repair Method does not develop a cost for a substitute Reproduction or Replacement plant.

The **Direct Cost Technique** (DCT), described on p.56 and p.57, “totals the cost of plants, services, or other materials needed to repair, reproduce, or functionally replace the item.”

The Repair Method worksheet on p.84 is effectively unworkable because Lines 6-11 a) develop and b) depreciate a cost for a “Replacement Tree.” This is confusing and distracting to the appraiser since the Repair Method, by definition, only makes repairs. The appraiser would have to recognize the conceptual worksheet error and ignore Lines 6-11. This would also be confusing to the intended user(s) of the appraisal.

Incidentally, the worksheet is not clear if the “replacement tree” cost would be a Reproduction Cost or a Functional Replacement Cost. Additionally, the *10<sup>th</sup> Ed.* provides no guidance on whether or when Repair Costs are adjusted for depreciation.

These problems are identified and partially corrected on the following sheets and a worked (single tree only) example is provided. Even corrected, the worksheet cannot accommodate more than a single tree and cannot accommodate description of various repair items; additional sheets are required.

# ANNOTATED Repair Method Direct Cost Technique

COMMENTS and CONTEXT    ERRORS▲

Client Name _____	Date _____	Case # _____
Phone _____	E-mail _____	
Address _____		

From Appraisal Contact Information Form, p. 154.

<b>Subject Tree</b>		
Species _____		
1. Trunk diameter*(D) _____ @ _____		
2. Cross-sectional area (line 1) <sup>2</sup> * 0.7854 = _____		in <sup>2</sup>
3. Condition rating _____		%
Health _____		
Structure _____		
Form _____		
4. Functional limitations _____		%
5. External limitations _____		%

Subject Tree is the Appraised Tree

From Appraisal Field Data Sheet, p. 155.

The 10<sup>th</sup> Ed. provides no guidance on whether Repair Costs are adjusted for depreciation.

<b>Replacement tree</b>		
6. Purchase price _____		\$ _____
7. Depreciated purchase cost † (line 6 x line 3 x line 4 x line 5)		\$ _____
8. Installation _____		\$ _____
9. Site preparation _____		\$ _____
10. Aftercare _____		\$ _____
<b>11. Subtotal</b> , subject tree (line 6 or 7 + line 8 + line 9 + line 10)		\$ _____

The Repair Method addresses partial damage or loss. There is no replacement or reproduction (p.55).

The numbering sequence will be preserved.

<b>Other Items</b>		
12. Turf _____		\$ _____
13. Hardscape _____		\$ _____
14. Clean-up _____		\$ _____
15. Repair _____		\$ _____
16. Aftercare _____		\$ _____
17. Other _____		\$ _____
<b>18. Subtotal, other items</b> (lines 12 + 13 + 14 + 15 + 16 + 17)		\$ _____
<b>Total repair cost</b> (line 11 + line 18)		\$ _____

These are Repair Items. They are not "other than" replacement.

Since there is no Replacement total at Line 11, Total Repair Cost is simply Line 18.

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.  
 † Apply depreciation if it is appropriate for the assignment.

▲ ERRORS are limited to conceptual and methodological flaws and exclude cosmetic issues.

**CORRECTED**  
**Repair Method**  
**Direct Cost Technique**

Client Name \_\_\_\_\_ Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address \_\_\_\_\_ From Appraisal Contact Information Form, p. 154.

**Subject Tree** From Appraisal Field Data Sheet, p. 155.  
 Species \_\_\_\_\_  
 1. Trunk diameter\*(D) \_\_\_\_\_ @ \_\_\_\_\_  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = \_\_\_\_\_ in<sup>2</sup>  
 3. Condition rating \_\_\_\_\_ %  
 Health \_\_\_\_\_  
 Structure \_\_\_\_\_  
 Form \_\_\_\_\_  
 4. Functional limitations \_\_\_\_\_ %  
 5. External limitations \_\_\_\_\_ %  
**See note<sup>‡</sup>**

**Replacement tree**  
 6. Purchase price  
 7. Depreciated purchase cost  
 8. Installation  
 9. Site preparation  
 10. Aftercare  
 11. **Subtotal, replacement tree**  
**There are no replacement or reproduction costs in the Repair Method**

**Repair Items**

12. Turf _____	\$ _____
13. Hardscape _____	\$ _____
14. Clean-up _____	\$ _____
15. Repair _____	\$ _____
16. Aftercare _____	\$ _____
17. Other _____	\$ _____
<b>18. Subtotal, other items</b> (lines 12 + 13 + 14 + 15 + 16 + 17)	\$ _____

**Total repair cost** (from line 18) \$ \_\_\_\_\_

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.  
<sup>‡</sup> Repair Costs are not typically depreciated.

Example 1, p.73 (single oak tree only).  
**Repair Method**  
**Direct Cost Technique**

Client Name \_\_\_\_\_ Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address \_\_\_\_\_ From Appraisal Contact Information Form, p. 154.

**Subject Tree**  
 Species Oak (Quercus sp.)  
 1. Trunk diameter\*(D) 16 inch @ 4.5 feet  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = 201 in<sup>2</sup>  
 3. Condition rating \_\_\_\_\_ %  
 Health \_\_\_\_\_  
 Structure \_\_\_\_\_  
 Form \_\_\_\_\_  
 4. Functional limitations \_\_\_\_\_ %  
 5. External limitations \_\_\_\_\_ %  
**See note<sup>‡</sup>**

**Replacement tree**  
 6. Purchase price  
 7. Depreciated purchase cost  
 8. Installation  
 9. Site preparation  
 10. Aftercare  
 11. **Subtotal, replacement tree**  
**There are no replacement or reproduction costs in the Repair Method**

**Repair Items**

12. Turf _____	\$ _____
13. Hardscape _____	\$ _____
14. Clean-up _____	\$ _____
15. Repair <u>#6 remove loose damaged bark from the oak tree.</u>	\$ <u>175.00</u>
16. Aftercare <u>#9 pest management for the oak tree.</u>	\$ <u>275.00</u>
17. Other <u>#10-11 soil analysis, fertilizer, mulch for the oak tree.</u>	\$ <u>350.00</u>
<b>18. Subtotal, other items</b> (lines 12 + 13 + 14 + 15 + 16 + 17)	\$ <u>800.00</u>

**Total repair cost** (from line 18) \$ 800.00

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.  
<sup>‡</sup> Repair Costs are not typically depreciated.

## Functional Replacement [Cost] Method – Trunk Formula Technique

The **Functional Replacement [Cost] Method** is described on p.55 and this **Worksheet** is on p.86.

P.55 “Functional replacement is the cost of substitute items that provide equivalent utility, benefits, or function, rather than the cost to produce an exact replica... For instance, a reasonable replacement... may be a similarly sized tree of a different species, a smaller tree of the same species, [or] several smaller trees...” Glossary p.158 “Functional replacement: (Ch. 5) The production of a copy of an existing item that has the same functional utility and is updated to current standards with deficiencies and superadequacies removed.”

Thus, according to the Glossary and appraisal theory, functional replacement reflects a loss in benefit or utility in the subject, i.e., depreciation. But 10<sup>th</sup> Edition text, confusingly allows functional replacement with the same benefits as reproduction, i.e., without depreciation.

The **Trunk Formula Technique (TFT)**, described on p.57, “...extrapolates the costs to purchase the largest commonly available nursery plant [or tree, LCANT] to the size of the plant being appraised,” “or a smaller tree [p.58]” using a Unit Tree Cost (described on p.57 and p.61).

When the Functional Replacement Tree is larger than the LCANT, the cost of the Functional Replacement Tree is unknown and TFT is used to develop the cost of the Functional Replacement Tree. If the cost of the Functional Replacement Tree was known, the **Direct Cost Technique (DCT)**, described on p.56 and p.57, would be used.

The worksheet on p.86 is unworkable because a) it attempts to use the unknown Functional Replacement Tree cost to solve for the unknown Functional Replacement Tree cost, b) it attempts to use the unknown Functional Replacement Tree cost to solve for the Unit Tree Cost, c) Unit Tree Cost is actually developed from the LCANT cost, which is not provided for on the worksheet, and d) the worksheet does not provide for the number of Subject Trees or Functional Replacement trees. Additionally, the 10<sup>th</sup> Edition provides inadequate guidance on when additional depreciation through %age ratings is appropriate in the Functional Replacement [Cost] Method.

These problems are identified and corrected on the following sheets and worked examples are provided.

**ANNOTATED**  
**Functional Replacement Method FRM**  
**Trunk Formula Technique TFT**

COMMENTS and CONTEXT    **ERRORS▲**

Client Name \_\_\_\_\_ Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address \_\_\_\_\_

From Appraisal Contact Information Form, p. 154.

**Subject Tree**  
 Species \_\_\_\_\_  
 1. Trunk diameter\*(D) \_\_\_\_\_ @ \_\_\_\_\_  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = \_\_\_\_\_ in<sup>2</sup>  
 3. Condition rating \_\_\_\_\_ %  
 Health \_\_\_\_\_  
 Structure \_\_\_\_\_  
 Form \_\_\_\_\_  
 4. Functional limitations \_\_\_\_\_ %  
 5. External limitations \_\_\_\_\_ %

Subject Tree is the Appraised Tree (it is not the Functional Replacement Tree - FRT)  
 From Appraisal Field Data Sheet, p. 155 (both worksheet and form neglect number of trees).  
 Line 2 is Subject Tree size.  
 Lines 3-5 are developed for the Subject Tree, but would be applied at Line 11 to the Functional Replacement Tree, if appropriate†. But FRM reduces or eliminates the need for depreciation (p.55, ¶9).  
 What is the risk of “double dipping” and excess depreciation? Textual guidance is inadequate

**Functional Replacement tree**  
 Utility or benefit to be replaced \_\_\_\_\_  
 Replacement plan \_\_\_\_\_  
 Species \_\_\_\_\_  
 6. Size (specify diameter or height) \_\_\_\_\_  
 7. If diameter, cross sectional area (line 6)<sup>2</sup> X 0.7854 = \_\_\_\_\_ in<sup>2</sup>  
 8. Functional replacement tree cost Source: \_\_\_\_\_ \$ \_\_\_\_\_

FRT (not the Subject Tree or the LCANT†)  
 P.55 “...a reasonable replacement for a damaged... tree... may be a similarly sized tree of a different species, a smaller tree of the same species , several smaller trees...”  
 Lines 6 and 7 are FRT size\* (neglects number of trees, e.g. Example 7, p.82).  
 This worksheet uses TFT (p.57) because FRT cost is unknown. If FRT cost was known DCT (p.56) would be used (as in Example 2a, p.74). The unknown cannot be used to solve for the unknown!

**Calculations**  
 9. Unit tree cost (line 8 / line 7 or RPAC) \$ \_\_\_\_\_  
 10. Basic functional replacement cost (line 2 X line 9) \$ \_\_\_\_\_  
 11. Depreciated functional replacement cost† (line 10 X line 3 X line 4 X line 5) \$ \_\_\_\_\_

TFT always relies on the unit cost developed from the LCANT† (p.57 & p.59 sidebar) or provided by the RPAC▼ (p.57 & Appendix 4). Unit tree cost is not developed from FRT size\* or the unknown FRT cost.  
 Basic functional replacement cost is developed from FRT size\* (Line 6 or 7 not Line 2) and [LCANT† based] unit tree cost (Line 9). See Example 4b, p.78 & Example 7, p.82. Using Line 2 here may incorrectly develop a Reproduction Cost for the Subject Tree.

**Additional costs**  
 Clean-up \_\_\_\_\_ \$ \_\_\_\_\_  
 Replacement tree installation \_\_\_\_\_ \$ \_\_\_\_\_  
 After care \_\_\_\_\_ \$ \_\_\_\_\_  
 Hardscape (specify) Or other landscape. \_\_\_\_\_ \$ \_\_\_\_\_  
 12. Total additional costs \$ \_\_\_\_\_

What is the risk of “double dipping” and excess depreciation?  
 Additional Costs are after depreciation.  
 This would be only the LCANT† installation cost (e.g. Example 4b, p.78) and assumes an installed unit cost is not used in order to conform with p. 58.  
 Line 13 is consistent with Example 4b, p.78 & Example 7, p.83 but conceptually flawed and inconsistent with the Glossary, p.158. Lines 9 & 10 report the functional replacement cost of a substitute for the appraised subject. Additional costs (Line 12) are not FRT costs. Line 13 should be Total Costs.

**13. Total, functional replacement cost** (line 11 + line 12) \$ \_\_\_\_\_  
**14. Rounded** \$ \_\_\_\_\_

▲ **ERRORS** are limited to conceptual and methodological flaws and exclude cosmetic issues.

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.  
 † Apply depreciation if it is appropriate for the assignment.

† LCANT = Largest Commonly Available Nursery Tree (p.57 ¶6 & Appendix 4).

▼ RPAC = Regional Plant Appraisal Committee.

**CORRECTED**  
 Functional Replacement Method **FRM**  
 Trunk Formula Technique **TFT**

Client Name \_\_\_\_\_ Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address \_\_\_\_\_

From Appraisal Contact Information Form, p. 154.

**Subject Tree**  
 Species \_\_\_\_\_  
 1. a Trunk diameter\*(D) \_\_\_\_\_ @ \_\_\_\_\_ 1b. Number of Trees▲ \_\_\_\_\_  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = \_\_\_\_\_ in<sup>2</sup>  
 3. Condition rating \_\_\_\_\_ %  
 Health \_\_\_\_\_  
 Structure \_\_\_\_\_  
 Form \_\_\_\_\_  
 4. Functional limitations \_\_\_\_\_ %  
 5. External limitations \_\_\_\_\_ %

From Appraisal Field Data Sheet, p. 155.

1a. Use Imperial or SI (metric) units as appropriate.  
 1b. Number of trees may be needed (see, e.g., Example 7, p.82). See Note▲.

**Functional Replacement tree**  
 Utility or benefit to be replaced \_\_\_\_\_  
 Replacement plan \_\_\_\_\_  
 Species \_\_\_\_\_  
 6. a Size (specify diameter or height) \_\_\_\_\_ 6b. Number of Trees▲ \_\_\_\_\_  
 7. If diameter, cross sectional area (line 6a)<sup>2</sup> X 0.7854 = \_\_\_\_\_ in<sup>2</sup>

Number of trees may be needed (see, e.g., Example 7, p.82). See Note▲.

**Calculations**  
 8. LCANT† a. Species \_\_\_\_\_ b. Size\* \_\_\_\_\_ c. Trunk Area \_\_\_\_\_ d. Cost \$ \_\_\_\_\_  
 9. Unit tree cost (line 8d / line 8b or 8c) or from RPAC. \$ \_\_\_\_\_  
 10. Basic functional replacement cost ((line 6a or line 7 X line 9) x line 6b) \$ \_\_\_\_\_  
 11. Depreciated functional replacement cost (line 10 X line 3 X line 4 X line 5)‡ \$ \_\_\_\_\_

Data grouped in corrected Line 8 to preserve worksheet layout. See Lines 9-11 in the worksheet on p.85.

Number of trees may be needed (see, e.g., Example 7, p.82).

**Additional costs**  
 Clean-up \_\_\_\_\_ \$ \_\_\_\_\_  
 Replacement tree installation \_\_\_\_\_ \$ \_\_\_\_\_  
 Aftercare \_\_\_\_\_ \$ \_\_\_\_\_  
 Hardscape or Landscape (specify) \_\_\_\_\_ \$ \_\_\_\_\_  
 12. Total additional costs \$ \_\_\_\_\_  
 13. Total Costs (line 11 + line 12) \$ \_\_\_\_\_  
 14. Rounded \$ \_\_\_\_\_

Lines 10 & 11 report FRT cost of a substitute for the appraised subject. Additional costs (Line 12) are not FRT costs.

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.

‡ Apply depreciation if it is appropriate for the assignment.

Textual guidance is inadequate.

10<sup>TH</sup> Ed. P.86 (Second Printing)

† LCANT = Largest Commonly Available Nursery Tree .

▲ If size, species, depreciation ratings, and installation cost are the same for all trees. Otherwise complete separate worksheets.

**Corrected**  
**Functional Replacement Method**  
**Trunk Formula Technique**

**Example 4b, p.78**

A single subject tree, functionally replaced with a single, smaller tree of the same species.

Client Name \_\_\_\_\_ Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address \_\_\_\_\_ From Appraisal Contact Information Form, p. 154.

**Subject Tree**

Species Red oak (*Quercus rubra*)  
 1.a Trunk diameter\*(D) 44 inch @ 4.5 ft. 1b. Number of Trees <sup>▲</sup> 1 A single tree.  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = 1,520 in<sup>2</sup>  
 3. Condition rating 80 %  
 Health Not specified in Example 4, assume the appraiser used the  
 Structure intuitive option as on p.49.  
 Form \_\_\_\_\_  
 4. Functional limitations 75 %  
 5. External limitations 80 %

**Functional Replacement tree**

Utility or benefit to be replaced The appraiser determines a 24 inch tree will  
 Replacement plan provide the same benefits.  
 Species Red Oak (*Quercus rubra*)  
 6.a Size (specify diameter or height) 24 inch 6b. Number of Trees <sup>▲</sup> 1 A single, smaller functional replacement tree of the same species.  
 7. If diameter, cross sectional area (line 6a)<sup>2</sup> X 0.7854 = 452 in<sup>2</sup>

**Calculations**

8. LCANT<sup>†</sup> a. Species Q.r. b. Size\* 5 inch. c. Trunk Area 19.6 d. Cost \$ 875  
 9. Unit tree cost (line 8d / line 8b or 8c) or from RPAC. \$ 44.56 } LCANT based unit cost is constant in Examples 4a and 4b. Unit cost is not FRT based.  
 10. Basic functional replacement cost ((line 6a or line 7 X line 9) x line 6b) \$ 20,160 } There are slight differences between calculated figures and the Example figures.  
 11. Depreciated functional replacement cost (line 10 X line 3 X line 4 X line 5)<sup>‡</sup> \$ 20,160 } Example 4b mistakenly says \$20,060  
The appraiser determines that additional depreciation is not appropriate for the assignment.

**Additional costs**

Clean-up \_\_\_\_\_ \$ 3,000  
 Replacement tree installation \_\_\_\_\_ \$ 300 } 10<sup>th</sup> Ed. appears to use \$300 as an example LCANT installation cost. In practice  
 Aftercare \_\_\_\_\_ \$ 600 } LCANT installation cost is likely to vary with LCANT size and source. This assumes  
 Hardscape or Landscape (specify) \_\_\_\_\_ \$ \_\_\_\_\_ } an installed unit cost is not used in order to conform with p. 58.  
 12. Total additional costs \$ 3,900  
 13. Total Costs (line 11 + line 12) \$ 24,160  
 14. Rounded \$ 24,160

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.

‡ Apply depreciation if it is appropriate for the assignment.

10<sup>TH</sup> Ed. P.86 (CORRECTED)

† LCANT = Largest Commonly Available Nursery Tree .

▲ If size, species, depreciation ratings, and installation cost are the same for all trees. Otherwise complete separate worksheets.



**Corrected**  
**Functional Replacement Method**  
**Trunk Formula Technique**

**Example 7, p.82 (Pines Only)**

Client Name \_\_\_\_\_ Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address \_\_\_\_\_ From Appraisal Contact Information Form, p. 154.

Multiple subject trees, functionally replaced with fewer multiple trees of the same size and species.

To work the entire example an additional worksheet would be used for the azaleas.

**Subject Tree**

Species Pines (*Pinus sp.*)  
 1.a Trunk diameter\*(D) 16 inch (average) @ 4.5 ft. 1b. Number of Trees▲ 12  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = 201 in<sup>2</sup>  
 3. Condition rating \_\_\_\_\_ %  
 Health Not specified in Example 7, assume the appraiser  
 Structure determined that all depreciation was accomplished by using  
 Form fewer functional replacement trees.  
 4. Functional limitations \_\_\_\_\_ %  
 5. External limitations \_\_\_\_\_ %

Multiple subject trees. See Note▲ .

**Functional Replacement tree**

Utility or benefit to be replaced The appraiser determines that six trees will provide  
 Replacement plan the same benefits as 12 subject trees.  
 Species Pines (*Pinus sp.*)  
 6.a Size (specify diameter or height) 16 inch 6b. Number of Trees▲ 6  
 7. If diameter, cross sectional area (line 6a)<sup>2</sup> X 0.7854 = 201 in<sup>2</sup>

Fewer multiple functional replacement trees of the same size and species. See Note▲ .

The azalea worksheet would develop cost per unit crown volume. ←  
 Example 2c, p.77 (Reproduction Method) would develop cost per unit height.

**Calculations**

8. LCANT† a. Species P.sp. b. Size\* 3 in. (48 in. box) c. Trunk Area 7"² d. Cost \$ 350  
 9. Unit tree cost (line 8d / line 8b or 8c) or from RPAC. \$ 50.00  
 10. Basic functional replacement cost ((line 6a or line 7 X line 9) x line 6b) \$ 60,300  
 11. Depreciated functional replacement cost (line 10 X line 3 X line 4 X line 5)‡ \$ 60,300

LCANT based unit cost. Unit cost is not FRT based.

(201 x \$50) = \$10,500 x 6 = \$60,300.

The appraiser determines that additional depreciation is not appropriate for the assignment.

**Additional costs**

Clean-up \_\_\_\_\_ \$ 6,000  
 Replacement tree installation \_\_\_\_\_ \$ 1,800  
 Aftercare \_\_\_\_\_ \$ 800  
 Hardscape or Landscape (specify) \_\_\_\_\_ \$ \_\_\_\_\_  
 12. Total additional costs \$ 8,600

Example additional costs for pines only, to illustrate calculations. Installation cost assumes an installed unit cost is not used in order to conform with p. 58.

**13. Total Costs** (line 11 + line 12) \$ 68,900  
**14. Rounded** \$ 69,000

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.

‡ Apply depreciation if it is appropriate for the assignment.

10<sup>TH</sup> Ed. P.86 (CORRECTED)

† LCANT = Largest Commonly Available Nursery Tree .

▲ If size, species, depreciation ratings, and installation cost are the same for all trees. Otherwise complete separate worksheets.

# Corrected Functional Replacement Method Trunk Formula Technique

## Un-Numbered Example, p.57

A single subject tree, functionally replaced with a single tree of the same size but different species (p.55 "...may be a similarly sized tree of a different species...")

Client Name \_\_\_\_\_ Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address \_\_\_\_\_ From Appraisal Contact Information Form, p. 154.

### Subject Tree

Species Red oak (*Quercus rubra*)  
 1.a Trunk diameter\*(D) 44 inch @ 4.5 ft. 1b. Number of Trees▲ 1  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = 1,520 in<sup>2</sup>  
 3. Condition rating 80 %  
 Health Not specified in Example 4, assume the appraiser used the  
 Structure intuitive option as on p.49.  
 Form \_\_\_\_\_  
 4. Functional limitations 75 %  
 5. External limitations 80 %

A single tree (size from Example 4b).

Glossary p.158: "Functional replacement: (Ch. 5) The production of a copy of an existing item that has the same functional utility and is updated to current standards with deficiencies and superadequacies removed."

Thus a functional replacement reflects a loss in benefit or utility in the subject, i.e., depreciation. It is unclear how developing a cost for a different species reflects depreciation.

### Functional Replacement tree

Utility or benefit to be replaced The 10<sup>th</sup> Ed. provides no guidance as to why using a  
 Replacement plan different species is functional replacement.  
 Species Red Maple (*Acer rubrum*)  
 6.a Size (specify diameter or height) 44 inch 6b. Number of Trees▲ 1  
 7. If diameter, cross sectional area (line 6a)<sup>2</sup> X 0.7854 = 1,520 in<sup>2</sup>

A single functional replacement tree of the same size but different species.

### Calculations

	Same	Lower
8. LCANT† a. Species <u>A.r.</u> b. Size* <u>5 inch</u> c. Trunk Area <u>19.6<sup>in2</sup></u> d. Cost \$ <u>875</u>	\$ <u>600</u>	\$ <u>600</u>
9. Unit tree cost (line 8d / line 8b or 8c) or from RPAC.	\$ <u>44.56</u>	\$ <u>30.61</u>
10. Basic functional replacement cost ((line 6a or line 7 X line 9) x line 6b)	\$ <u>67,731</u>	\$ <u>46,527</u>
11. Depreciated functional replacement cost (line 10 X line 3 X line 4 X line 5)‡	\$ <u>67,731</u>	\$ <u>46,527</u>

If the unit tree cost is the same as for the subject species, then it is unclear why this is not a Reproduction Cost.

If the unit tree cost is lower than for the subject species, obviously the Functional Replacement Cost will be lower than the Reproduction Cost. But it is unclear why or how using a lower cost species reflects or corrects for a deficiency or superadequacy in the subject, i.e., depreciation.

### Additional costs

Clean-up _____	\$ _____	
Replacement tree installation _____	\$ _____	
Aftercare _____	\$ _____	
Hardscape or Landscape (specify) _____	\$ _____	
12. Total additional costs	\$ <u>0.00</u>	\$ <u>0.00</u>
<b>13. Total Costs</b> (line 11 + line 12)	\$ <u>67,731</u>	\$ <u>46,527</u>
<b>14. Rounded</b>	\$ <u>67,700</u>	\$ <u>46,500</u>

Additional costs are neglected in this example for clarity.

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.

‡ Apply depreciation if it is appropriate for the assignment.

10<sup>TH</sup> Ed. P.86 (CORRECTED)

† LCANT = Largest Commonly Available Nursery Tree .

▲ If size, species, depreciation ratings, and installation cost are the same for all trees. Otherwise complete separate worksheets.

## Reproduction [Cost] Method & Functional Replacement [Cost] Method – Direct Cost Technique (Missing Worksheets)

The **Reproduction [Cost] Method** is described on p.55. “Reproduction cost is the cost to replicate or duplicate the item being appraised.”

The **Functional Replacement [Cost] Method** is described on p.55.

P.55 “Functional replacement is the cost of substitute items that provide equivalent utility, benefits, or function, rather than the cost to produce an exact replica... For instance, a reasonable replacement... may be a similarly sized tree of a different species, a smaller tree of the same species, [or] several smaller trees...” Glossary p.158 “Functional replacement: (Ch. 5) The production of a copy of an existing item that has the same functional utility and is updated to current standards with deficiencies and superadequacies removed.”

Thus, functional replacement reflects a loss in benefit or utility in the subject, i.e., depreciation.

The **Direct Cost Technique** (DCT), described on p.56 and p.57, “totals the cost of plants, services, or other materials needed to repair, reproduce, or functionally replace the item.”

The 10<sup>th</sup> Edition (second printing) does not include worksheets for the Reproduction Method – DCT, or for the Functional Replacement [Cost] Method – DCT. Worksheets and worked examples are provided on the following sheets, and for consistency have followed the format and organization of other 10<sup>th</sup> Edition worksheets, to the extent possible.

## Reproduction Method Direct Cost Technique

Client Name Mrs. Butler Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address Example 2b, p.75.

### Subject Tree

Species Arborvitae (*Thuja occidentalis*) hedge  
 1. a Trunk diameter\*(D) 15 feet high @ na 1b. Number of Trees<sup>▲</sup> 10  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = na in<sup>2</sup>  
 3. Condition rating 85 %  
 Health Not specified in Example 2b, assume the  
 Structure appraiser used the intuitive option as on p.49.  
 Form \_\_\_\_\_  
 4. Functional limitations 100 %  
 5. External limitations 100 %

### Reproduction tree

Species Arborvitae (*Thuja occidentalis*) hedge  
 6. Size\* (specify diameter or height) 15 feet high  
 7. Basic reproduction tree cost (\$ 400 x line 1b) \$ 4,000  
 Source Woody's Wholesale Warehouse  
 8. Depreciated reproduction cost<sup>‡</sup> (line 7 x line 3 x line 4 x line 5) \$ 3,400

### Additional costs

9. Cleanup \_\_\_\_\_ \$ 400  
 10. Reproduction tree installation (\$ 100 x line 1b) \$ 1,000  
 11. Aftercare PHC / IPM \$ 600  
 12. Other Temporary irrigation \_\_\_\_\_ \$ 150  
 13. Sub-total additional costs (line 9 + line 10 + line 11 + line 12) \$ 2,150  
**14. Total reproduction cost** (line 7 + line 12) \$ 6,150  
**OR**  
**Total depreciated reproduction cost** (line 8 + line 12) \$ 5,550  
 15. Rounded \$ 5,600

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.  
<sup>‡</sup> Apply depreciation if it is appropriate for the assignment.  
<sup>▲</sup> If size, species, depreciation ratings, and installation cost are the same for all trees. Otherwise complete separate worksheets.

## Functional Replacement Method Direct Cost Technique

Client Name Mrs. Butler Date \_\_\_\_\_ Case # \_\_\_\_\_  
 Phone \_\_\_\_\_ E-mail \_\_\_\_\_  
 Address Example 2a, p.74 (Option 1).

### Subject Tree

Species Arborvitae (*Thuja occidentalis*) hedge  
 1. a Trunk diameter\*(D) 15 feet high @ na 1b. Number of Trees<sup>▲</sup> 10  
 2. Cross-sectional area (line 1)<sup>2</sup> \* 0.7854 = na in<sup>2</sup>  
 3. Condition rating \_\_\_\_\_ %  
 Health \_\_\_\_\_ Not specified in Example 2a, assume the  
 Structure \_\_\_\_\_ appraiser determined that all depreciation was  
 Form \_\_\_\_\_ accomplished by using smaller functional  
 4. Functional limitations replacement trees. \_\_\_\_\_ %  
 5. External limitations \_\_\_\_\_ %

### Functional replacement tree

Utility or benefit to be replaced Install a new hedge composed of ten  
 Replacement plan 10 foot tall trees  
 Species Arborvitae (*Thuja occidentalis*)  
 6a. Size\* (specify diameter or height) 10 feet high 6b. Number of Trees<sup>▲</sup> 10  
 7. Basic FRT cost. (\$ 200 x line 6b) \$ 2,000  
 Source Woody's Wholesale Warehouse 2,000  
 7. Depreciated FRT cost<sup>‡</sup> (line 7 x line 3 x line 4 x line 5) \$ na

### Additional costs

9. Cleanup \_\_\_\_\_ \$ 400  
 10. FRT installation (\$ 50 x line 6b) \$ 500  
 11. Aftercare PHC / IPM \$ 600  
 12. Other Temporary irrigation \_\_\_\_\_ \$ 150  
 13. Sub-total additional costs (line 9 + line 10 + line 11 + line 12) \$ 1,650  
**14. Total FRT cost** (line 7 + line 12) \$ 3,650  
**OR**  
**Total depreciated FRT cost** (line 8 + line 12) \$ na  
 15. Rounded \$ 3,700

\* diameter and cross-sectional area may be replaced with plant area, volume, or height as appropriate.  
<sup>‡</sup> Apply depreciation if it is appropriate for the assignment.  
<sup>▲</sup> If size, species, depreciation ratings, and installation cost are the same for all trees. Otherwise complete separate worksheets.