# Attachment E
# Example Production Schedule Backup

## 1.0 Introduction

Key inputs to the project schedule include production rates for various tasks or activities and quantities. This attachment discusses the development of quantities used for input to the project schedule. Table E-1 contains the quantities associated with site preparation, dredging, and site restoration.

To develop the schedule and associated quantities, the upper Hudson River site was first segmented into smaller "sites," which generally are indicated by river mile and a shoreline qualifier, which indicates if the site is on the eastern or western shore of the river. A sequence of remediation was developed, and where appropriate, each river mile site was further divided into sub-sites, or dredging management cells (DMC). Figure E-1 depicts the DMCs.

# 2.0 Categories Considered

## 2.1 Dredging Equipment

Attachment F summarizes an evaluation of applicable dredge equipment for the Hudson River. For the purposes of this production schedule, the working limits of large mechanical dredging equipment were identified and associated quantities estimated.

## 2.2 Dredging Quantities

For the development of the project schedule, quantities for each site or DMC, where appropriate, were determined using Arc View geographic information system (GIS) information from the Feasibility Study (FS) and by visual inspection of black and white aerial photography (1 inch = 400 feet) taken in the spring of 2002 to facilitate site preparation and restoration quantities for the project schedule. Site preparation, mechanical dredging, and site restoration, and total dredging quantities are presented in Table E-1. Figure E-1 depicts DMCs.

## 2.3 Containment Barriers

Placement of containment barriers was configured conceptually and is shown on Figure E-1. Sheet piling is depicted perpendicular to flow and HDPE is shown parallel to flow. It is anticipated that containment would not be used within the navigational channel or at the mouth or any significant tributary.

## 2.4 Obstructions

Obstructions that would be expected to be encountered during dredging such as bridges, docks, sewer/storm water outfalls, boat launches, power lines, lock walls, and lock ballards were identified and quantified through inspection of the spring 2002 black and white aerial photographs. These quantities were then used to calculate the additional duration needed for site preparation and site restoration.

## 2.5 Shoreline Characteristics

Shoreline features, such as trees, large rocks/rip rap, small rocks/ sand, residential/man made structures, concrete structures, and stream/river inlets were determined through visual inspection of the black and white aerial photographs. Using the calculated shoreline length from Arc View GIS, an estimate of each quantity was made (see Table E-1).

**Table E-1**
**Productivity Schedule Backup Table**

| Dredging Year | Seasonal Volume Dredged (CY) | Cumulative Volume Dredged (CY) | Site Location | | | | | | Dredging | | | | Restoration | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dredge Site Number | Site Location E=East, W=West, NAV=Nav. Channel | Location by Mile River | Dredge Management Cell (DMC) | River Section | Pool Location Description | Total Volume of Dredging (CY) | Volume By Production Equipment (CY) | Volume By Alternative Equipment (CY) | Additional Dredging Around Obstructions (Days on Critical Path) | Total Standard Backfill (AC) | Total Critical Backfill (AC) | DMC Backfill (AC) | Does DMC contain "critical" area that requires additional backfill to meet pre-dredge grade? | Restore Shoreline (LF) | Remove Containment (LF) | Additional Duration for Replacing Obstructions (Days on Critical Path) |
| Phase 1 (Year 1) | 268,977 | 268,977 | 1 | E & W | Around Rogers Island (RM 193.75 - 194.5) | 1 | 1 | Thompson Island Pool | 77,261 | 64,517 | 12,743 | 1 | 39 | 11 | 4 | Yes | 2,119 | 527 | 0 |
| | | | | | | 1a | | | | | | 0 | | | | | Included in above | 513 | 0 |
| | | | | | | 2 | | | | | | 1 | | | 11 | No | 4,432 | 207 | 1 |
| | | | 2 | W | RM 193.5 - 193.75 | 3 | | | 13,193 | 13,193 | 0 | 1 | | | 2 | No | 872 | 1,096 | 0 |
| | | | 3 | W | RM 192.5 - 193.5 W | 4a | | | 50,000 | 42,964 | 7,036 | 0 | | | 7 | Yes | 2,287 | 2,225 | 0 |
| | | | | | | 5 | | | 80,336 | 80,336 | 0 | 0 | | | 0 | No | | | |
| | | | 5 | W | RM 191.5 - 192.5 W | 9 | | | 48,188 | 45,055 | 3,132 | 0 | | | 12 | No | 460 | 468 | 0 |
| | | | | | | 10 | | | | | | 0 | | | 12 | No | 956 | 1,425 | 1 |
| | | | | | | 11 | | | | | | 0 | | | 3 | No | 1,461 | 1,650 | 1 |
| Phase 2 (Year 2) | 529,440 | 798,417 | 5 | W | RM 192.5 - 193.5 W | 4b | 1 | Thompson Island Pool | 137,476 | 118,131 | 19,345 | 0 | 11 | 67 | 18 | Yes | 3,131 | 3,042 | 0 |
| | | | 8 | W | RM 190.5 - 191.5 W | 15 | | | 128,807 | 125,207 | 3,600 | 0 | | | 5 | No | 1,137 | 1,552 | 0 |
| | | | | | | 16 | | | | | | 0 | | | 6 | No | 1,866 | 2,025 | 0 |
| | | | | | | 17 | | | | | | 0 | | | 4 | Yes | 1,421 | 1,527 | 0 |
| | | | | | | 18 | | | | | | 0 | | | 0 | No | | | |
| | | | 10 (1) | W | RM 189.5 - 190.5 W | 17a | | | 194,682 | 39,939 | 154,743 | 0 | | | 27 | Yes | 13,430 | 3,048 | 0 |
| | | | 12 | W | RM 188.5 - 189.5 W | 17b | | | 68,475 | 61,396 | 7,079 | 0 | | | 13 | Yes | 2,375 | 2,618 | 0 |
| | | | | | | 29 | | | | | | 0 | | | 3 | Yes | 884 | 1,019 | 0 |
| | | | | | | 30 | | | | | | 0 | | | 0 | No | | | |
| | | | | | | 31 | | | | | | 0 | | | 3 | Yes | 222 | 607 | 0 |
| Phase 2 (Year 3) | 601,810 | 1,400,227 | 4 | E | RM 192.5 - 193.5 E | 6 | 1 | Thompson Island Pool | 54,409 | 52,828 | 1,581 | 0 | 52 | 34 | 25 | No | 3,424 | 3,629 | 1 |
| | | | 6 | E | RM 191.5 - 192.5 E | 7 | | | 244,803 | 179,746 | 65,057 | 0 | | | 23 | Yes | 10,910 | 6,075 | 7 |
| | | | | | | 8 | | | | | | 0 | | | 0 | No | | | |
| | | | 7 | E | RM 190.5 - 191.5 E | 12 | | | 153,868 | 151,662 | 2,207 | 0 | | | 5 | No | 2,414 | 2,714 | 0 |
| | | | | | | 13 | | | | | | 0 | | | 0 | No | | | |
| | | | | | | 14 | | | | | | 0 | | | 3 | No | 950 | 1,191 | 0 |
| | | | 13 | W | RM 187.5 - 188.5 | 32 | 2 | TI Dam to Fort Miller Dam / Lock 6 | 13,026 | 12,936 | 90 | 0 | | | 4 | No | 1,386 | 1,254 | 0 |
| | | | 14 | W | RM 186.5 - 187.5 | 33 | | | 40,461 | 34,682 | 5,779 | 0 | | | 11 | Yes | 1,277 | 1,786 | 1 |
| | | | | | | 34 | | | | | | 0 | | | 8 | No | 1,763 | 1,852 | 0 |
| | | | 18 | W | RM 183.25 - 184.25 W | 40 | | Fort Miller Dam / Lock 6 to Northumberland Dam | 95,243 | 93,402 | 1,840 | 0 | | | 3 | No | 1,561 | | 1 |
| | | | | | | 41 | | | | | | 0 | | | 4 | No | 1,397 | 1,703 | 3 |
| Phase 2 (Year 4) | 564,533 | 1,964,760 | 9 | E | RM 189.5 - 190.5 E | 19 | 1 | Thompson Island Pool | 168,129 | 163,985 | 4,143 | 0 | 62 | 0 | 5 | No | 709 | 931 | 0 |
| | | | | | | 20 | | | | | | 0 | | | 2 | No | 407 | | |
| | | | | | | 21 | | | | | | 0 | | | 16 | No | 2,582 | 2,660 | 2 |
| | | | | | | 22 | | | | | | 0 | | | 2 | No | 1,010 | 1,010 | 1 |
| | | | 11 | E | RM 188.5 - 189.5 E | 22a | | | 142,611 | 129,564 | 13,047 | 0 | | | 4 | No | 980 | 1,333 | 1 |
| | | | | | | 23 | | | | | | 0 | | | 0 | No | 290 | | |
| | | | | | | 24 | | | | | | 0 | | | 4 | No | 1,406 | 1,737 | 0 |
| | | | | | | 25 | | | | | | 1 | | | 4 | No | 305 | 1,391 | 0 |
| | | | | | | 26 | | | | | | 0 | | | 0 | No | 696 | | |
| | | | | | | 27 | | | | | | 0 | | | 2 | No | 614 | 559 | 0 |
| | | | | | | 28 | | | | | | 0 | | | 0 | No | | | |
| | | | 15 | E | RM 185.25 - 186.25 | 35 | 2 | Fort Miller Dam / Lock 6 to Northumberland Dam | 253,793 | 247,865 | 5,928 | 1 | | | 23 | No | 3,006 | 2,557 | 5 |
| | | | | | | 36 | | | | | | 0 | | | 0 | No | | | |
| Phase 2 (Year 5) | 447,387 | 2,412,147 | 16 | E | RM 184.25 - 185.25 | 37 | 2 | Fort Miller Dam / Lock 6 to Northumberland Dam | 30,168 | 30,168 | 0 | 0 | 3 | 50 | 3 | No | 2,241 | 2,459 | 0 |
| | | | 17 | E | RM 183.25 - 184.25 E | 38 | | | 93,160 | 79,307 | 13,853 | 0 | | | 13 | Yes | 1,845 | 2,321 | 0 |
| | | | | | | 39 | | | | | | 0 | | | 6 | Yes | 2,027 | 1,365 | 0 |
| | | | 19 | NAV | RM 176.75 - 177.25 | 42* | 3 | Lock 5 to Lock 4 / Stillwater Dam | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 20 | NAV | RM 175.0 - 175.25 | 43* | | | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 21 | NAV | RM 171.5 - 172.0 | 44* | | | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 22 | E | RM 169.25 - 170.25 | 45* | | | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | | | | 46* | | | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | | | | 47 | | | 224,806 | 166,434 | 58,372 | 0 | | | 31 | Yes | 4,640 | 4,936 | 1 |
| | | | 23 | NAV | RM 167.0 - 167.5 | 48* | | Lock 4 / Stillwater Dam to Lock 3 | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 25 | NAV | RM 164.25- 165.0 | 51* | | | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 26 | NAV | RM 164.0 - 164.25 | 52* | | Lock 3 to Lock 2 | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 28 | NAV | RM 162.25 - 162.75 | 56* | | Lock 2 to Lock 1 | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 29 | NAV | RM 159.25 - 159.75 | 57* | | | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | 30 | NAV | RM 158.5 - 159.25 | 58* | | Lock 1 to Federal Dam | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| Phase 2 (Year 6) | 237,860 | 2,650,000 | 24 | W | RM 165.75 - 166.75 | 49* | 3 | Lock 4 / Stillwater Dam to Lock 3 | 9,023 | 9,023 | 0 | 1 | 0 | 63 | 0 | No | | | |
| | | | | | | 50 | | | 144,966 | 50,648 | 94,317 | 1 | | | 31 | Yes | 3,432 | 3,711 | 0 |
| | | | 27 | W | RM 163.25 - 164.25 | 53* | | Lock 3 to Lock 2 | 9,023 | 9,023 | 0 | 0 | | | 0 | No | | | |
| | | | | | | 54 | | | 74,848 | 31,261 | 43,588 | 2 | | | 16 | Yes | 1,035 | 1,458 | 0 |
| | | | | | | 55 | | | | | | 4 | | | 16 | Yes | 2,663 | 864 | 0 |

(1)Of the volume dredged by alternative equipment, 93,300 cy are dredged by a production dredge or other dredge operating at a production rate of 82 c

Note: Represents areas where no containment will be needed; area either in channel (navigational dredging) or behind rock outcrop

* Volume for this DMC is assumed to be 1/13th of Total Navigational Dredging Volume in River Section 3

**Table E-1**
**Productivity Schedule Backup Table**

| Dredging Year | Seasonal Volume Dredged (CY) | Cumulative Volume Dredged (CY) | Site Location | | | | | | Site Preparation | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dredge Site Number | Site Location E=East, W=West, NAV=Nav. Channel | Location by Mile River | Dredge Management Cell (DMC) | River Section | Pool Location Description | Install Steel Sheet Piling (LF) | Install HDPE Silt Barriers (LF) | Additional Schedule Duration Due to Obstructions (Days on Critical Path) | Number of Obstructions by Obstruction Type | | | | | | | Shoreline Characteristics (LF) | | | | | |
| | | | | | | | | | | | | Bridges | Docks | WWTP Outlet | Boat Launch | Power Lines | Lock Wall | Lock Ballards | Trees | Rip Rap / Large Rocks | Residential / Man Made | Natural Shore / Small rocks | Concrete Structures | Stream Inlet |
| Phase 1 (Year 1) | 268,977 | 268,977 | 1 | E & W | Around Rogers Island (RM 193.75 - 194.5) | 1 | 1 | Thompson Island Pool | 111 | 416 | 1 | 2 | | | | | | | 710 | | | 710 | | |
| | | | | | | 1a | | | 513 | 0 | 0 | | | | | | | | 350 | | | 350 | | |
| | | | | | | 2 | | | 207 | 0 | 2 | | 1 | 1 | | | | | 2,549 | | | 1,663 | 20 | 200 |
| | | | 2 | W | RM 193.5 - 193.75 | 3 | | | 409 | 687 | 1 | | | | 1 | | | | 426 | | | 426 | 20 | |
| | | | 3 | W | RM 192.5 - 193.5 W | 4a | | | 546 | 1,679 | 1 | | 1 | | | 1 | | | 304 | | | 304 | | |
| | | | | | | 5 | | | | | | | | | | 1 | | | | | | | | |
| | | | 5 | W | RM 191.5 - 192.5 W | 9 | | | 167 | 301 | 0 | | | | | | | | 46 | | | 414 | | |
| | | | | | | 10 | | | 520 | 905 | 1 | | 1 | | | | | | 382 | | | 574 | | |
| | | | | | | 11 | | | 335 | 1,315 | 1 | | 1 | | | | | | 365 | 731 | | 365 | | |
| Phase 2 (Year 2) | 529,440 | 798,417 | 5 | W | RM 192.5 - 193.5 W | 4b | 1 | Thompson Island Pool | 189 | 2,853 | 0 | | | | | | | | 1,261 | | | 1,261 | | |
| | | | 8 | W | RM 190.5 - 191.5 W | 15 | | | 449 | 1,103 | 0 | | | | | | | | 519 | 100 | | 519 | | |
| | | | | | | 16 | | | 358 | 1,667 | 0 | | | | | | | | 467 | | | 1,400 | | |
| | | | | | | 17 | | | 397 | 1,130 | 0 | | | | | | | | 987 | | | 284 | | 150 |
| | | | | | | 18 | | | | | | | | | | | | | | | | | | |
| | | | 10 (1) | W | RM 189.5 - 190.5 W | 17a | | | 509 | 2,539 | 0 | | | | | 1 | | | 6,565 | 100 | | 6,565 | | 200 |
| | | | 12 | W | RM 188.5 - 189.5 W | 17b | | | 261 | 2,358 | 0 | | | | | | | | 713 | | | 1,663 | | |
| | | | | | | 29 | | | 215 | 803 | 0 | | | | | | | | 215 | 400 | | 239 | | 30 |
| | | | | | | 30 | | | | | | | | | | | | | | | | | | |
| | | | | | | 31 | | | 100 | 507 | 0 | | | | | | | | 122 | 100 | | | | |
| Phase 2 (Year 3) | 601,810 | 1,400,227 | 4 | E | RM 192.5 - 193.5 E | 6 | 1 | Thompson Island Pool | 136 | 3,493 | 1 | | 1 | | | 1 | | | 1,198 | 1,198 | | 1,027 | | |
| | | | 6 | E | RM 191.5 - 192.5 E | 7 | | | 1,018 | 5,057 | 7 | | 7 | | | | | | 7,832 | | | 2,727 | | 350 |
| | | | | | | 8 | | | | | | | | | | | | | | | | | | |
| | | | 7 | E | RM 190.5 - 191.5 E | 12 | | | 362 | 2,352 | 0 | | | | | | | | 1,772 | 400 | | 241 | | |
| | | | | | | 13 | | | | | | | | | | | | | | | | | | |
| | | | | | | 14 | | | 360 | 831 | 0 | | | | | | | | 660 | 100 | | 190 | | |
| | | | 13 | W | RM 187.5 - 188.5 | 32 | 2 | TI Dam to Fort Miller Dam / Lock 6 | 418 | 835 | 0 | | | | | | | | 1,109 | | | 277 | | |
| | | | 14 | W | RM 186.5 - 187.5 | 33 | | | 333 | 1,454 | 1 | | 1 | | | | | | 1,022 | | | 255 | | |
| | | | | | | 34 | | | 363 | 1,489 | 0 | | | | | | | | 1,486 | | | 176 | | 100 |
| | | | 18 | W | RM 183.25 - 184.25 W | 40 | | Fort Miller Dam / Lock 6 to Northumberland Dam | | | 1 | | 1 | | | | | | 200 | 850 | | 511 | | |
| | | | | | | 41 | | | 383 | 1,320 | 3 | | 3 | | | | | | 101 | | 101 | 1,824 | | |
| Phase 2 (Year 4) | 564,533 | 1,964,760 | 9 | E | RM 189.5 - 190.5 E | 19 | 1 | Thompson Island Pool | 413 | 517 | 0 | | | | | | | | 177 | | | 390 | | |
| | | | | | | 20 | | | | | | | | | | | | | 407 | | | | | |
| | | | | | | 21 | | | 449 | 2,211 | 0 | | 2 | | | | | | 421 | 800 | 100 | 1,262 | | |
| | | | | | | 22 | | | 0 | 1,010 | 0 | | 1 | | | | | | 202 | | 200 | 608 | | |
| | | | 11 | E | RM 188.5 - 189.5 E | 22a | | | 475 | 858 | 0 | | 1 | | | | | | 685 | 50 | | 245 | | |
| | | | | | | 23 | | | | | | | | | | | | | 145 | | | 145 | | |
| | | | | | | 24 | | | 604 | 1,133 | 0 | | | | | | | | 1,265 | | | 141 | | |
| | | | | | | 25 | | | 775 | 616 | 1 | | | | | | 1 | | 274 | | | 30 | 600 | |
| | | | | | | 26 | | | | | | | | | | | | | 696 | | | | | |
| | | | | | | 27 | | | 100 | 459 | 0 | | | | | | | | 207 | 200 | | 207 | | |
| | | | | | | 28 | | | | | | | | | | | | | | | | | | |
| | | | 15 | E | RM 185.25 - 186.25 | 35 | 2 | Fort Miller Dam / Lock 6 to Northumberland Dam | 506 | 2,052 | 6 | | 5 | | | | 2 | | 301 | 300 | | 2,255 | 800 | 150 |
| | | | | | | 36 | | | | | | | | | | | | | | | | | | |
| Phase 2 (Year 5) | 447,387 | 2,412,147 | 16 | E | RM 184.25 - 185.25 | 37 | 2 | Fort Miller Dam / Lock 6 to Northumberland Dam | 331 | 2,128 | 0 | | | | | | | | 1,468 | 100 | | 672 | | |
| | | | 17 | E | RM 183.25 - 184.25 E | 38 | | | 957 | 1,364 | 0 | | | | | | | | 1,291 | | | 553 | | |
| | | | | | | 39 | | | 170 | 1,195 | 0 | | | | | | | | 140 | 1,200 | | 57 | | |
| | | | 19 | NAV | RM 176.75 - 177.25 | 42* | 3 | Lock 5 to Lock 4 / Stillwater Dam | | | | | | | | | | | | | | | | |
| | | | 20 | NAV | RM 175.0 - 175.25 | 43* | | | | | | | | | | | | | | | | | | |
| | | | 21 | NAV | RM 171.5 - 172.0 | 44* | | | | | | | | | | | | | | | | | | |
| | | | 22 | E | RM 169.25 - 170.25 | 45* | | | | | | | | | | | | | | | | | | |
| | | | | | | 46* | | | | | | | | | | | | | | | | | | |
| | | | | | | 47 | | | 588 | 4,348 | 1 | | 1 | | | | | | 2,220 | 200 | | 2,220 | | |
| | | | 23 | NAV | RM 167.0 - 167.5 | 48* | | Lock 4 / Stillwater Dam to Lock 3 | | | | | | | | | | | | | | | | |
| | | | 25 | NAV | RM 164.25- 165.0 | 51* | | | | | | | | | | | | | | | | | | |
| | | | 26 | NAV | RM 164.0 - 164.25 | 52* | | Lock 3 to Lock 2 | | | | | | | | | | | | | | | | |
| | | | 28 | NAV | RM 162.25 - 162.75 | 56* | | Lock 2 to Lock 1 | | | | | | | | | | | | | | | | |
| | | | 29 | NAV | RM 159.25 - 159.75 | 57* | | | | | | | | | | | | | | | | | | |
| | | | 30 | NAV | RM 158.5 - 159.25 | 58* | | Lock 1 to Federal Dam | | | | | | | | | | | | | | | | |
| Phase 2 (Year 6) | 237,860 | 2,650,000 | 24 | W | RM 165.75 - 166.75 | 49* | 3 | Lock 4 / Stillwater Dam to Lock 3 | | | 1 | | | | 1 | | | | | | | | 20 | |
| | | | | | | 50 | | | 619 | 3,092 | 1 | | | | | | 2 | | | 600 | | 1,932 | 900 | |
| | | | 27 | W | RM 163.25 - 164.25 | 53* | | Lock 3 to Lock 2 | | | | | | | | | | | | | | | | |
| | | | | | | 54 | | | 576 | 882 | 2 | | | | | | | 3 | 778 | | | 207 | | 50 |
| | | | | | | 55 | | | 864 | 0 | 4 | | | | | 1 | 7 | | 133 | 1,864 | | 666 | | 400 |

(1)Of the volume dredged by alternative equipment, 93,300 cy are dredged by a production dredge or other dredge operating at a production rate of 82 c

Note: Represents areas where no containment will be needed; area either in channel (navigational dredging) or behind rock outcrop

* Volume for this DMC is assumed to be 1/13th of Total Navigational Dredging Volume in River Section 3