United States
Department of
Agriculture

**Natural
Resources
Conservation
Service**

**Part 654 Stream Restoration Design
National Engineering Handbook**

Chapter 15 Project Implementation

Issued August 2007

Cover photo: Appropriate designs will enable elements of the restoration plan to be implemented and meet the restoration goals, while minimizing disturbance. Rushed implementation without proper designs can result in failure.

Advisory Note

Techniques and approaches contained in this handbook are not all-inclusive, nor universally applicable. Designing stream restorations requires appropriate training and experience, especially to identify conditions where various approaches, tools, and techniques are most applicable, as well as their limitations for design. Note also that product names are included only to show type and availability and do not constitute endorsement for their specific use.

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Chapter 15 Project Implementation

654.1500 Purpose

This chapter addresses general project implementation issues with an emphasis on U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) programs, requirements, and guidance. The three phases involved in project implementation are design, contracts and agreements, and installation. This chapter describes how the phases are interrelated, how each phase requires knowledge of the limitations or restrictions of the other phases, and provides a general overview of the process of project implementation with appropriate references to other NRCS and government contracting documents. For the purposes of this document, the planning phase, including determination of the nature and source of problems, as well as the desired objectives and future conditions, is presented in detail in National Engineering Handbook (NEH) 654.01, 654.02, and 654.03.

654.1501 Introduction

Project implementation is divided into three phases:

- design
- contracts and agreements
- installation

All stream restoration projects should follow these three phases. The level of effort required for implementation may vary substantially from project to project. The level of effort depends on the complexity of the project, tolerance for risk, and the available resources. As described in NEH654.02, the design phase may trigger cycling back through the planning process if preliminary designs cannot meet the planned project objectives.

Stream restoration projects may include design elements that specifically focus on removing perturbations or sources of impairment of ecosystem functions. Critical design elements may include nonstructural approaches requiring changed management, altered access, or possibly changes in institutional regulations. This chapter focuses on the design elements of a stream restoration plan that require construction and how to implement them. Restoration plans can, however, range from simple changes in resource management to largely structural alternatives. The design elements of a restoration plan to be implemented depend heavily on the results of a planning process that adequately identifies the nature of the stream's problems, their sources, and realistic goals and expectations for the implemented project actions.

Specific aspects of the other phases must be considered when working on a single phase in the implementation process. This requires a general understanding of all three phases. For example, the completeness of the design package depends on the type of construction contract or agreement that will be used. The type of construction contract or agreement depends on the staff available to direct the work and/or provide quality assurance (QA).

Direction throughout the implementation process is provided by NRCS policies, technical guidance, and program guidelines. Any project involving the NRCS

is required to follow these established policies and guidelines. The division of responsibilities between the NRCS and a program sponsor is detailed in a project agreement of which there are several different types. These agreements detail the responsibilities of both parties. Sponsors using NRCS program funds are required to follow many of the same implementation policies and guidelines as are required of the NRCS.

The NRCS has been implementing projects for many years, and over that time many technical resources have been developed. Although stream restoration projects may be a complex blend of ecology and engineering, the general process of project implementation is the same as for other types of NRCS projects.

654.1502 Planning

(a) Importance

Planning is the foundation of any successful stream restoration project. The planning process provides an opportunity to investigate, discuss opportunities, and formulate realistic goals and feasible and constructible alternatives. Proper planning provides direction for design, procurement, and installation. During the planning phase, potential problems and/or restrictions are identified. The earlier potential project problems are identified, the easier it is to make changes to the plan without requiring additional time, effort, and funding. See NEH654.02 for a thorough description of the planning process.

654.1503 Design

The planning process defines the purpose for the design, defines realistic goals for the restoration, formulates alternatives to achieve these goals, and determines the level of detail in the design package. The design process requires a more in-depth look at the processes causing the problems and acting on the design features. The design follows NRCS policy in the NRCS National Engineering Manual (NEM) 511, Design.

Problems, objectives, and selected alternatives from the planning process are used by the designer as the basis for the design. The designer will also need other information such as potential permitting requirements, funding, material availability, site or reach limitations, and expected construction period. This information should be collected during the planning process.

(a) Design package

The level of detail of the design package depends on the type of contract or agreement chosen during planning. For example, a firm, fixed-price contract requires a complete design package that will allow contractors to understand in detail what is to be constructed; whereas, a time and material contract may only require minimal drawings and no specifications. The level of detail for design is decided during planning based on available resources and complexity of the project. A complete design package typically contains the following:

- design report
- construction drawings
- material specifications
- design specifications
- engineer's cost estimate
- bid schedule
- estimated construction schedule

(b) Design scheduling

Stream restoration projects may have short periods of time during the year when construction activities can take place. These limited construction periods may be due to harvesting and planting seasons, varying flow levels, fish migration and spawning, or other limitations related to sediment concentrations and limitations on ingress and egress. In addition, the plant materials used in many soil bioengineering support practices for the design require specific harvesting, storage and handling requirements, and planting times. When setting design completion dates and scheduling design staff, consideration must be given to the time required by the contracting process to meet construction scheduling needs.

Funding thresholds and/or construction schedules may require the design to allow for phases of construction. If all of the design cannot be constructed at one time, additional work is generally required to protect what has been completed. Work required to protect each phase should be included in the drawings.

(c) Constructability

For structural alternatives, constructability always must be considered throughout the design. Examples of constructability issues include:

- material availability
- equipment availability
- site and equipment access
- labor requirements
- dewatering requirements
- special measures to protect riparian conditions

When considering constructability, the designers must consider not only if it can be built, but also how can it easily be built. The designers should always be thinking of alternative designs that would have equal or better results but are easier to construct.

(d) Design layout

The physical location of design elements in a stream restoration project can be critical to its success. Although there may be considerable flexibility in the

location (dimensions, alignment, and slope of some design attributes), other design elements may require strict adherence to specific criteria or limitations. However, designers should resist placing unnecessarily restrictive tolerances, as this will increase construction and inspection costs. By providing sufficient information on the design drawings to locate these features in the field, as well as the appropriate tolerances, the responsibility for accurate placement can be placed on the contractor. The design elements can also be checked for accurate placement by someone other than the designer.

It is important for a designer to consider how the design will be transferred from the plans into the field, or fitting the design into the landscape. Only in rare circumstances should a designer direct the construction of major projects without laying out the design in the field. The most common methods used to locate features on a drawing include referencing to a baseline or centerline, creating a grid, or using a global positioning system (GPS). Table 15–1 lists these methods and outlines some of the advantages and disadvantages of each.

Regardless of which method is used, benchmarks must be established and identified on the plans. Benchmarks are objects in the field of known location that will not be disturbed throughout the construction of the project. The location of baselines, centerlines, and local coordinate systems are referenced to benchmarks. When using GPS coordinates, benchmarks are useful as a means of checking the accuracy of the GPS system.

(e) Quality assurance and quality control

When a complete design package is not required, the level of design detail on the plans and specifications depends on the experience and availability of QA and quality control (QC) staff and the experience and reliability of the contractor. For example, minimal drawings and no specifications may be sufficient if a time and material or a labor-hour contract is employed, experienced construction personnel familiar with the design will be onsite, and the contractor is experienced and reliable. Precautions with this method include limited information to perform a review and reliance on the availability of experienced construction oversight.

Table 15–1 Advantages and disadvantages of commonly used layout methods

	Advantages	Disadvantages
Baseline	• Only two points required to locate baseline	• Difficult to reference when features are along a curve
Centerline	• Easy to reference feature locations using stations • Follows the direction of the stream	• Can be difficult or impossible to stake out in the middle of a stream • Curve data required to locate in the field
Grid	• Easy to reference features using CAD	• Difficult to use on large sites • Time consuming to layout grid
Global positioning system (GPS)	• No referencing to other control points • Points can be located quickly in the field • Easy to reference features using CAD	• Satellite reception can be a problem in heavily wooded areas

654.1504 Contracts and agreements

Stream restoration projects may be accomplished using contracts and/or certain types of agreements. There are several factors to consider when choosing the type of contract or agreement best suited for a specific stream restoration project. These factors include:

- program requirements
- project agreement requirements
- extent of design
- complexity of design
- human and equipment resources
- schedule or timeframe
- cost of installation

Stream restoration projects constructed under a specific NRCS program must be installed in conformance with those program's guidelines. Program guidelines often restrict the type of contract or agreement that may be used for installing the practices.

Project agreements include any agreement entered into by the NRCS and sponsors in which detailed working arrangements are established for the installation of cost-shared measures. The responsibilities of all parties involved and details of the actual implementation procedures for the specific project are detailed in the project agreement.

The type of contract depends on the time frame for starting and completing the work. When work must begin and be completed quickly, equipment rental may be more appropriate due to the limited time to obtain or design detailed plans and specifications. This is also contingent upon the availability of qualified NRCS or sponsor representatives needed to direct the work, as noted above.

(a) Contracting

When describing the various methods of contracting for the installation of practices for NRCS projects, it is necessary to divide contracts into two main categories: Federal contracts and non-Federal contracts. These contracts can be further divided into formal or informal, depending on the value of the contract. Under the Federal Acquisition Regulations (FAR) as of 2005, formal contracts must be used for projects with a value greater than $100,000, and informal contracts and contracting procedures can be used for projects with a value of $100,000 or less. Informal contracts are those put in place using simplified acquisition procedures. The advantages of using simplified acquisition procedures are:

- simplicity and ease of buying
- purchases can be made more expeditiously
- usually less paperwork
- usually lower administration costs

There are several types of Federal and non-Federal contracts, each having specific advantages and disadvantages.

It is important to understand the advantages and disadvantages of the types of contracts available for use in the installation of stream restoration measures to complement the planning, design, and construction efforts required for a successful project. Some advantages might be minimal administrative burden, minimal construction oversight, and maximum incentive for the contractor to control cost. Conversely, some types of contracts require maximum administrative burden, maximum construction oversight, and no incentive for the contractor to control costs. Table 15–2 summarizes the various items to consider when selecting the type of contract best suited for a specific situation.

Federal contracts

Federal contracts are governed by the FAR. Information can be found at the following Web site:

http://www.arnet.gov/far

NRCS contracting regulations also include the Agriculture Acquisition Regulation and the NRCS Acquisition Regulations. Federal contracts that might be applicable to stream restoration work include fixed-price, cost-reimbursement, incentive, time-and-materials, labor-hour, equipment rental, and letter contracts. These contracts can be formal or informal (simplified procedures), depending on the value of the contract.

Federal contracts are normally used when project sponsors do not have the capacity to solicit, award, and/or administer a locally awarded contract and/or have the necessary resources to accomplish the work with their own forces under certain types of agreement actions. A warranted NRCS contracting officer can provide pertinent information and guidance for Federal contracting procedures. A wide variety of Federal contract types may be used under the acquisition regulations. The selection of the appropriate type of contract, as well as the method of solicitation, is situation driven. NRCS Federal contract actions must comply with all applicable acquisition regulations and policy.

Fixed-price contracts—Place the maximum risk and full responsibility on the contractor for all costs and resulting profit or loss associated with the work. This type of contract provides the maximum incentive for the contractor to control costs and perform effectively and imposes a minimum administrative burden on NRCS and/or sponsors. A fixed-price contract requires the contractor to understand, in detail, what is to be constructed before bidding to do the work. This requires a design that includes detailed drawings, specifications, and a bid schedule containing a bid item for each major item of work. The designer must provide a cost estimate by bid item so that the cost of the work can be estimated and the contracting officer can ac-

Table 15–2 Contract comparisons

Contract type	Federal contract	Non-Federal contract	Administrative burden	Construction oversight	Incentive for cost control	Required design effort	NRCS/sponsor's risk	Contractor's risk	Comments
Fixed-price	√	√	low	low	high	high	low	high	Most preferable type of construction contract. Must have accurate cost estimate and construction details
Cost reimbursement	√	√	high	high	low	low	high	low	Use only when uncertainties in contract performance do not permit use of any type of fixed-price contract
Incentive	√	√	—	—	high	—	—	—	Rarely used for construction. May be fixed-price or cost-reimbursement contract
Time-and-materials	√	√	high	high	low	low	high	low	Use only when accurate cost estimate, extent or duration of work cannot be established. See limitations at FAR 16.601(c)
Labor-hour	√	√	high	high	low	low	high	low	Same as time-and-materials contract, but without materials being supplied by contractor
Letter	√	√	high	high	low	low	high	low	Requires national level approval. Only use when the head of the contracting activity determines in writing that no other contract type is suitable. FAR 16.603–3
Equipment rental	√	√	high	high	low	low	high	low	Similar to time-and-materials or labor-hour contracts and is use when nature of work and limited design details preclude using a fixed-price construction contract

Note: — indicates the rating could be either high or low

cess the reasonableness of the bids. Most fixed-price contracts are awarded after contractors have submitted a sealed bid in response to an Invitation for Bids (IFB). The IFB includes the drawings and specifications for the work and specific contract requirements. This is the most preferred type of contract and should be used to the maximum extent practicable. Fixed-price contracts can be accomplished using either simplified or formal acquisition procedures, depending on the value of the project. The design effort and level of detail may be the same for simplified fixed-price contracts as it is for formal fixed-price contracts.

Cost-reimbursement contracts—Suitable for use only when the cost of the work cannot be estimated with sufficient accuracy to use a fixed-price contract. The cost of the work is estimated for the purpose of obligating funds; however, a detailed cost analysis is not required. The contractor must have an accounting system adequate for determining incurred costs that are reimbursable. This type of contract requires significantly more government oversight during the construction phase to document that efficient construction methods and efficient cost controls are being used. It provides little incentive for the contractor to control costs and perform effectively and imposes a much larger administrative burden on the contractor, NRCS, and/or the sponsors.

Incentive contracts—Link the contractor's profit to performance by establishing reasonable and attainable targets that are clearly communicated to the contractor. These contracts are designed to motivate the contractor in specific areas that might not otherwise be emphasized, such as motivation for early completion. Incentive contracts discourage inefficiency and waste. Incentive contracts can be fixed-price incentive contracts or cost-reimbursable incentive contracts. These types of contracts are normally used for performance-based service contracts and rarely, if ever, are used for construction work.

Time-and-materials contracts—Used to procure supplies or services on the basis of direct labor and materials costs. Time-and-materials contracts should be used only when it is not possible to accurately estimate the extent or duration of work or to anticipate costs with any degree of confidence. With this type of contract, there is no incentive to the contractor to control costs, significant government oversight is required, and a much larger administrative burden is imposed on NRCS and/or the sponsor.

Labor-hour contracts—A variation of the time-and-materials contract, differing only in that materials are not supplied by the contractor.

Equipment rental contracts—Used in instances where a fixed-price construction contract would be impractical because of the nature of the work and when it would not be feasible to prepare detailed drawings and specifications. It requires substantial construction oversight and imposes an additional administrative burden on NRCS.

Letter contracts—Written preliminary contractual instruments that authorize the contractor to begin work immediately. A letter contract should be as complete and definite as feasible under the circumstances, and there are requirements for scheduling price negotiations and establishing set prices as soon as feasible. A letter contract may be used only after the head of the contracting activity or a designee at the national level determines in writing that no other contract is suitable.

Non-Federal contracts

Non-Federal contracts, like Federal contracts, can be categorized as formal or informal (using simplified procedures). They can also take the form of fixed-price, cost-reimbursement, or incentive type contracts in accordance with the Contracting Local Organization's (CLO) procurement regulations and the Federal requirements imposed on the CLO as provided in the Code of Federal Regulations (CFR) at 7 CFR 3016.36. CLO contracts are those administered by a non-Federal entity such as state government, county government, or other local sponsor. The contract language, including general and special contract clauses, will likely differ from one entity to another. The CLO, NRCS, or both, will provide a QA inspector to verify that work is performed according to design and contract requirements. In other instances, the CLO may require substantial NRCS assistance to develop and administer the contract and may incorporate NRCS general and special provisions in the contract.

The amount of NRCS involvement in non-Federal contracts may depend on the capabilities of the contracting organization.

Fixed-price CLO contracts—Can include both construction contracts and vegetative contracts. A fixed-price CLO contract is similar to a fixed-price FAR contract in that it requires the same degree of detailed design, and it places the maximum responsibility on the contractor, with the maximum incentive to perform in an efficient cost-effective manner. Also, note that a CLO contract awarded under informal or simplified procedures can require the same degree of detailed design as a formal contract. As with fixed-price FAR contracts, the level of construction oversight and contract administration may be minimized with a fixed-price CLO contract. This is not to infer that no QA inspection is needed, only that the intensity of inspection may be less on this type of contract than on other contract types, such as equipment rental contracts where the inspector must verify the hours of equipment and personnel and must direct the work.

Time-and-materials CLO contracts—Non-Federal contracts used to procure supplies or services on the basis of direct labor and materials costs. Time-and-materials contracts should be used only when it is not possible to accurately estimate the extent or duration of work or to anticipate costs with any degree of confidence. With this type of contract, there is no incentive to the contractor to control costs, significant CLO oversight is required, and a much larger administrative burden is imposed on the CLO and perhaps the NRCS (depending on the NRCS level of involvement).

Labor-hour contracts—A variation of the time-and-materials contract, differing only in that materials are not supplied by the contractor.

Equipment rental contracts—Non-Federal contracts used in instances where a fixed-price CLO construction contract would be impractical because of the nature of the work, and it would not be feasible to prepare detailed drawings and specifications. It requires substantial construction oversight and imposes an administrative burden on the CLO and/or NRCS.

Contract value

The value of the contract dictates whether simplified or if formal contracting procedures must be used. As of 2005, simplified acquisition procedures under the FAR may be used for work that costs $100,000 or less, but more formal acquisition procedures are required for work in excess of $100,000. Fixed-price contracts, cost-reimbursement contracts, incentive contracts, time-and-materials contracts, labor-hour contracts, letter contracts, or equipment rental contracts may be used under both simplified and formal contracting procedures. Table 15–3 lists the various contracting procedures required for construction or service (equipment rental) contracts at each dollar threshold where changes in the procedural requirements are required by the FAR.

While it is most often the size of the procurement that determines whether to use simplified or formal procedures, there can be some apparent exceptions in practice. For example, exigency Emergency Watershed Protection (EWP) solicitations with estimated costs in excess of $100,000 require a formal bid opening and award of a formal contract. However, the advertising time and scope can be shortened because of the exigency. In some extreme cases, the NRCS would only notify 5 or 10 contractors, and only 2 or 3 days would be needed to develop the solicitation, hold the site showing, and award the contract. But, the result should be a formal contract for those actions exceeding the simplified acquisition threshold of $100,000.

(b) Project agreements and other assistance relationships

The NRCS and a sponsor can jointly install works of improvement using project (cooperative) agreements. The NRCS policy regarding project agreements is found in the National Contracts, Grants and Cooperative Agreement Manual (NCGCAM) GM 120–510 through 517. Project (cooperative) agreements must define the contracting, and/or use of the sponsor's forces, cost-sharing (as applicable), and administrative procedures that will be used to carry out the selected method of installation. The sponsor may choose to contract for or perform, using their own forces, engineering designs, cost estimates, installation of the stream restoration measures, and construction oversight and associated inspection services. The agreements must define the contracting, cost-sharing (as applicable), and administrative procedures needed to carry out the selected method.

The NRCS must assure the quality of the design, contracting, and any construction carried out by project sponsors through design quality reviews, construction oversight, or other means established by the state conservationist (STC) and in accordance with the NCGCAM and NEM.

Table 15–3 Dollar thresholds requiring changes in procedures by the FAR

	Construction				Service (equipment rental)				
Alternate methods of contracting	**Less than $2,000**	**More than $2,000**	**More than $25,000**	**More than $100,000**	**More than $2,500**	**Less than $10,000**	**More than $10,000**	**More than $25,000**	**More than $100,000**
Verbal quotes	x				x	x			
Written quotes (RFQ)		x	x				x	x	
Sealed bid (IFB)				x2/			*	*	*
Negotiated (RFP) (rarely used)							*	*	*
8(a) Set Aside	*	*	*	*	*	*	*	*	*
FedBizOpps—less than 30 days			x1/					x1/	
FedBizOpps—minimum 30 days				x1/					x1/
Davis Bacon		x	x	x					
Service Contract Act					x	x	x	x	x1/
Bid security				x2/					
Performance and payment security			x3/	x			x3/		

* if applicable
1/ Unless EWP Exigency or 8(a) Set Aside
2/ Unless 8(a) Set Aside
3/ Alternate payment protection
Can use one solicitation with multiple award contracts
Can use Indefinite Quantity Contract with minimum/maximum qualifies, rather than Fixed Price with quantity variations
EWP work can be done using Master Package

Structural practices designed by non-NRCS personnel will be done under the direction and supervision of a licensed professional engineer in the state where the measures will be installed. All design reviews will be in accordance with the NEM 501 and with any procedures established by the state conservation engineer (SCE). Predesign conferences for more complex measures must be held with appropriate representatives from the NRCS, the sponsor(s), and the architectural and engineering (A&E) firm, if used.

The cooperative agreement approach can extend the capacity of NRCS to provide assistance under NRCS programs. It can also provide the sponsor with primary control of the installation process, and it can match the level of cooperative work to the sponsor's capability and resources. For example, the sponsor may lack or be unable to obtain contract administration assistance, but may have personnel or be able to secure professional engineering and other technical services that can evaluate, design measures, and prepare contract documents. The NRCS could then provide contract administration and construction assistance after the sponsor prepares the drawings and specifications. The project (cooperative) agreement would list the division of responsibilities with explicit details of the tasks to be performed by the sponsor and the tasks to be performed by the NRCS.

Regardless of the type of agreement that will be used, all project (financial assistance cooperative) agreements must meet the applicable requirements in the NCGCAM GM 120–510 through 517, as well as the applicable Federal regulations in 7 CFR 3015 and 3016.

In addition, the NRCS must ensure that all required prerequisites to signing a project agreement for the installation of project measures are met in accordance with NCGCAM 514.35.

For projects installed using contracts, there must be a project agreement between the sponsor and the NRCS authorizing the implementation of the stream restoration measures using either a Federal contract or non-Federal contract.

Project agreement for a Federal contract
A project agreement for Federal contracting may be used for installation of stream restoration measures in accordance with the NCGCAM 510.10(b) and 510.11. This work is normally performed under a competitively awarded contract. The NCGCAM, sections 510 and 514, provides applicable guidance and detail for the use of this type of project agreement.

Project agreement for a non-Federal contract
A project agreement for non-Federal contracting may be used in accordance with the NCGCAM 510.10(b), 510.11, and 510.30 through 510.39. This work should also be performed under a competitively awarded contract. The NCGCAM, sections 510 and 514, provides applicable guidance and detail for the use of this type of project agreement.

In addition, project installation may be accomplished using contract and/or agreement actions. Project agreements can be used to install works of improvement as follows.

Project agreement for force account
Force account agreements may be used for project installation in accordance with the NCGCAM 510.15. This method is used when the sponsor performs the work using its own equipment and personnel. The sponsor may supplement their own equipment through rental of relatively minor amounts of equipment. However, force account agreements can offer the potential for additional costs and poor quality work. Because of these factors, the sponsors may install project measures by force account only under the conditions indicated in the NCGCAM 510.15(c). The NCGCAM, sections 510 and 514, provides applicable guidance and detail for the use of this type of project agreement. The Sponsoring Local Organization (SLO) must keep accurate records of cost of all work performed. It requires substantial construction oversight and imposes an administrative burden on the parties to the agreement. Difficulty may arise in coordinating the force account work with the ongoing duties and other work that is required of the SLO workforce.

Project agreement for division of work
Division of work agreements may be used for cost-sharing land treatment measures. These are measures that are authorized under Public Law 83–566 (PL 566) watershed work. This type of project agreement may be used for project installation in accordance with NCGCAM 510.16. The work is divided between NRCS and SLO with the details of each organization's responsibilities spelled out in the project agreement. If the work is to be shared on a division of work basis, it must be described in the watershed plan, and

cost estimates must be included in the supporting tables. The SLO is not required to keep records of expenditures. Detailed NRCS cost estimates are maintained to document that PL 566 costs do not exceed the authorized rate.

Project agreement for performance of work
Performance of work agreements require that the value of work to be performed by the SLO be determined by negotiation between the SLO and NRCS and be included in the project agreement. The NRCS must estimate the cost of the work to establish the maximum value of work before signing the agreement. This type of project agreement may be used for project installation in accordance with NCGCAM 510.17. This is applicable if the works of improvement are to be cost shared on a percentage basis. The percentage rate of cost sharing is to be included in the watershed plan agreement. This work should normally be performed under a competitively awarded contract. However, the sponsors may be able to perform certain elements of the project work with their own forces or with contributed labor, equipment or materials in lieu of providing cash. The NCGCAM 510.17 and 514 provide applicable guidance and detail for the use of this type of project agreement.

Project agreement for average cost
A project agreement for average cost may be used for installation of land treatment measures in accordance with NCGCAM 510.18. This method cannot be used with units of government. Average cost land treatment contracts (financial assistance agreements) are authorized under PL 566 with the cost of the work being the average cost of similar work within a defined area over a set period of time. The average cost is usually set by county and is determined by averaging the cost of all similar work for which there are records for a 1-year period. For example, the per-unit cost of work, such as bank shaping, would be averaged for all of the bank shaping that falls within a specific level or category. Bank shaping might be categorized as light, medium, or heavy based on the effort required to shape an acre. An average cost of light, medium, or heavy bank shaping would then be established for a county based on previous year costs.

Long-term contracts (financial assistance agreements) are authorized under PL 566 for contracts between the SLO and a landowner or between the NRCS and a landowner. The contract period ranges from 3 to 10 years with all cost-shared measures being installed at least 2 years before the financial assistance agreement expires. The work items are scheduled according to a plan with the purpose of reducing erosion and sediment damages within a PL 566 watershed. The work includes items like shaping and vegetating eroded areas, building grade control structures, and other measures that are approved for the program. Stream restoration may be approved for this type of program.

(c) Personnel for administering contracts and agreements

Contracting is a team effort that relies on individual team members to perform specific tasks. The titles of team members are sometimes different for non-Federal contracts than for Federal contracts, but their tasks transcend from one to the other. The six principal responsible positions on a team are administrative officer, contracting officer (CO), contract specialist, SCE, GR/COR, and government inspector.

NRCS state administrative officer (SAO)
The SAO is responsible for all administrative matters for CLO contracts and most agreements. This includes making sure funds are available and that people and equipment needed to administer the agreement and any resulting contract will be available when needed. For Federal contracts, the NRCS-warranted contracting officer is responsible for contractual matters in accordance with FAR 1.602.

Contracting officer (CO)
The CO is responsible for administering the contract including ensuring that the proper type of contract is being used and funds are spent according to regulations. For CLO contracts, the NRCS contract specialist or SAO is there to lend guidance to the CO who is a CLO official or employee.

NRCS contract specialist
The NRCS contract specialist assists the administrative officer in contract matters for CLO contracts and agreements. The NRCS contract specialist is the CO on Federal contracts. The contract specialist works closely with the design engineer to ensure that the design package included in the solicitation package contains the information needed for the work to be contracted.

State conservation engineer (SCE)
The SCE is responsible for the design and ultimately responsible for ensuring proper construction of the works of improvement. The SCE or an assigned staff member works closely with the CO on Federal contracts or the NRCS administrative officer and NRCS contract specialist for CLO contracts to provide design information needed to define and contract the work. The SCE is also involved in making sure there is adequate inspection staff to provide the required level of construction oversight and QA.

Government representative (GR) on non-Federal contracts or contracting officer's representative (COR) on FAR contracts
The GR or COR is responsible to the SEC and the CO to see that the work is carried out as designed and in accordance with the contract requirements.

Construction inspector
The construction inspector is responsible for the day-to-day QA inspection required to ensure that the work is installed according to the design, industry standards, and contract requirements. The construction inspector is responsible to the GR/COR and CO to assure that the quality of the work is consistent with contract requirements.

The availability of personnel to perform specific tasks should be the first consideration when planning a project. For example, consider a stream restoration project that is planned to use volunteer labor under a force account agreement with the sponsor and rented equipment through a Federal or non-Federal equipment rental contract. The project will use live vegetation that must be planted during a specific planting season. This type of work would require contract personnel to prepare the equipment rental contract within a narrow timeframe and require significant construction oversight by trained field personnel. This normally requires much more oversight and administrative effort than would be the case with a firm fixed-price contract. A fixed-price contract would require a very detailed and thorough design package, but would likely require less contract administration and construction oversight. It might also be possible to do the work under a locally led CLO contract with relatively little burden on NRCS contracting personnel and minimal NRCS construction oversight.

654.1505 Installation

Installation of stream restoration projects in accordance with approved drawings and specifications is essential if the project is to serve its intended purpose and expected service life with normal operation and maintenance. The NRCS has standardized construction practices and procedures to ensure that stream restoration and other projects are installed according to design. These procedures provide uniformity in NRCS activities and result in common understanding between all parties involved with the design and installation of stream restoration and other projects. Policy concerning NRCS construction practices and procedures can be found in the NEM 512.

(a) Personnel required during installation

Installation of a stream restoration project is a team effort where each team member has specific responsibilities. The team is made up of the following members:

- owner or contracting officer
- engineer
- specialists for support of specific design elements
- government representative or contracting officer's representative
- construction inspector
- contractor

Owner
The owner is responsible for contracting for construction. For NRCS Federal contracts, the NRCS is considered the owner during construction and according to the FAR, the CO is responsible for ensuring performance of all necessary actions for effective contracting, ensuring compliance with the terms of the contract, and safeguarding the interest of the United States in its contractual relationship. On non-Federal contracts, the CLO is considered the owner during construction and an employee or CLO official serves as CO. A private individual or group is considered the owner on jobs that are administered by a private individual or group.

Engineer
The engineer is responsible for the technical requirements of project installation and represents the owner. The engineer is assigned technical and contract administration duties as outlined in the quality assurance plan (QAP) and in an appointment letter issued by the CO of Federal contracts or issued by the SAO for non-Federal contracts. The engineer may be an NRCS employee, an A&E firm employee, or an employee of the CLO or partnership agency.

Other specialists including biologist, ecologist, forester, fluvial geomorphologist, or others
Other specialists may be needed to support specific elements of the design, monitor specific site conditions for plants and animals, and assure that goals of the planned project are realized through the construction and implementation of the project's design elements. A specialist may be an NRCS employee, an A&E firm employee, or an employee of the CLO or partnership agency.

Government representative
The GR is an NRCS employee who has the responsibility to protect the government's interest and maintain close working relations with the CLO. The GR is an engineer if NRCS has QA responsibility for a construction project. The NRCS administrative officer will appoint a GR by letter for all construction contracts that are administered by others and that use Federal funds. This appointment is not normally provided for contracts handled by private individuals or informal groups.

Contracting officer's representative
The COR is an NRCS employee appointed by the CO and has the responsibility to protect the government's interest on Federal contracts. On NRCS construction projects, the COR is an engineer with responsibility for QA.

Construction inspector
The construction inspector is responsible for QA testing, engineering surveys, daily documentation of construction activities, coordination with the contractor's QC personnel, and maintaining the as-built plans. The NRCS CO or SAO appoints the inspector for Federal and non-Federal contracts respectively. The level of inspection required of the construction inspector is detailed in the QAP. For work other than that performed under formal and some informal contracts, formal appointment of an inspector is not required. However, an inspection staffing plan must be developed and approved in accordance with NCGCAM 516.3 for all project agreements in excess of $25,000 which results in either a non-Federal contract, force account agreement, or a performance of work agreement. The inspector should be made aware of the specific items that require QA inspection with sufficient guidance given to ensure that the inspection is adequate to achieve compliance with the design.

Contractor
The contractor is an individual or firm that installs the stream restoration measures. The contract or agreement with the owner may be formal, as in project installation, or informal, as with an individual landowner or informal group. As mentioned in the contracts and agreements section, provisions are available for the project sponsor(s) to perform work with their own forces under agreements that may include division of work, performance of work, or force account. Thus, the sponsor could also be the contractor.

(b) Preconstruction activities

Preconstruction activities include soliciting contractors, showing the site, selecting the contractor, and meeting with the contractor before construction. The time and effort devoted to preconstruction activities vary according to the complexity and value of the work. The objective in performing these activities is to ensure that the prospective bidders understand the work and contract requirements they must fulfill if they are selected to do the work and acquire the services of a responsible qualified contractor.

Soliciting contractors to bid the work
Solicitation marks the beginning of preconstruction activities. The solicitation package for both formal and informal fixed-price contracts consists of the drawings, specifications, bid schedule, and contract provisions with which the contractor must be familiar to bid the work. For informal work performed under a land treatment contract (financial assistance agreements), the contract used to delineate the work performed may be an agreement between an individual land user and a contractor. In this case, a minimal amount of written materials may be all the contractor needs to bid the work.

For formal contracts valued in excess of $100,000, the solicitation process generally takes 60 to 90 days. During this time, the CO compiles the solicitation package, advertises the work to prospective bidders, shows the site, opens bids, determines the responsive low bidder, and awards the contract. For Federal contracts, a solicitation notice must be posted for a minimum of 30 days on the Federal Business Opportunities (FedBizOpps) Web site so that it is available to all who wish to bid the work. The COR/GR reviews the solicitation package and provides comments to the CO before the solicitation package is issued. The COR/GR is normally responsible for staking the site for the site showing and assisting with the site showing. The construction inspector should also be involved at the earliest possible stage to provide review comments, assist in staking, and assist with the site showing.

When performing work under an Emergency Watershed Program (EWP) exigency, the time for the formal solicitation process may be greatly reduced if the emergency dictates this need and the action is in accordance with FAR 6.302–2. As an example, 5 to 10 contractors are notified and given an opportunity to bid the work, and the development of the solicitation, site showing, and contract award may be accomplished in as little as 2 or 3 days. For all other contracts exceeding the simplified acquisition threshold of $100,000, the work must be advertised on FedBizOpps with a solicitation notice posted a minimum of 30 days.

The amount of time needed to solicit contractors and award the contract may be much less than needed for formal contracts valued in excess of $100,000. Contracts valued at $100,000 or less may be accomplished using a simplified acquisition process with less stringent requirements. See table 15–2 for a list of the items to consider whenever selecting the type of contract and/or agreement best suited for a specific project situation.

The concept of advertising and bidding the work based on drawings and specifications that accurately depict the planned work also applies to informal contracts such as those between landowner and contractor. In some cases, the value of the work does not warrant taking the time to solicit bids from several contractors. The work may be depicted with sketches and/or a field review requiring minimal overall preconstruction activities.

Showing the site to potential bidders

Showing the site to the potential bidders is necessary so that they may inspect the area, determine the scope of the work, and receive answers to questions. Stakes and/or flagging shall be used to identify major items of work and their relationship to other elements of the proposed project. For formal contracts, the site showing is conducted by the CO with assistance from the COR/GR. The CO normally reviews contract items, and the COR/GR reviews the technical items. The inspector(s) should attend so that they have first hand knowledge of items discussed and contractor's concerns. The following items should be identified and discussed at the site showing, as appropriate:

- access roads and site entrance
- rights-of-way and construction limits
- clearing limits
- onsite vegetation or instream features that must be preserved
- location of known utilities
- proposed location of the design features of the project
- existing structures to be removed
- proposed borrow and waste areas
- location of geologic test holes/pits
- contractor's responsibility for pollution control and stormwater permit
- environmental issues
- construction safety
- other important features

Questions should be answered by referring to the solicitation package when the answer can be found in the package. When a question cannot be answered by referring to a specific part of the solicitation package, the question and answer should be recorded and included in an amendment to the solicitation package that is made available before the bid opening to all solicitation package holders. This process can also apply to solicitations using simplified acquisition procedures if site conditions or the complexity of the work warrants the need for a more formal site showing.

Conversely, if the work is relatively simple in nature and informal contracts are used, the items listed above should be reviewed with the contractor before the work begins. In most cases, these items have a bearing on the value of the work and should be reviewed with the contractor before bidding the work.

Awarding a contract
This comes after the CO determines that the low bidder is responsible. A responsible bidder must have the capacity, credit, integrity, tenacity, and perseverance to perform the work as specified. In making this determination, the CO may rely on the COR/GR to review submittals and perform a field review of the contractor's equipment and operations on previous or ongoing jobs. The CO will generally interview others who have dealt with the contractor to obtain their views of the contractor's capacity, integrity, tenacity, and perseverance.

Preconstruction conference
A preconstruction conference should be attended by the CO, COR/GR, inspector, and contractor before beginning construction. For Federal contracts, the term postaward conference is used. For informal work, the owner, engineer, inspector, and contractor should meet before construction to ensure that all have a thorough understanding of the work. The following items should be reviewed, as appropriate:

- drawings and specifications
- contract provisions
- invoicing procedures and progress payments
- contractor's construction schedule
- land rights and construction work limits
- permits
- easements
- work restrictions
- utilities in or near the work area
- construction safety, public safety, and safety plan
- sanitary facilities
- construction office space if provided by the contractor
- construction materials and material approval process
- staking and construction surveying
- contractor QC
- owner QA
- removal of water and dewatering plan(s)
- stream closures
- protected species of plant or animal
- weather and time extensions
- for intermittent inspection, a checklist of items to be inspected where the contractor or owner are required to notify the inspector
- any other item that could have an impact on the work

For formal contract work, the preconstruction conference minutes and all basic information of the conference should be recorded in the official job diary. This may also be applicable for informal contracts as needs dictate.

(c) Construction activities

Work begins
The work begins on formal contracts only after the contractor has received a notice-to-proceed (NTP). The engineer or construction inspector and the contractor schedule to meet onsite at the beginning of work to review last minute details before the start of work. For formal contracts, there are several items that must be in place before the start of the work including:

- contractor's safety plan, first-aid facilities (first-aid kit, stretcher)
- construction barriers as necessary
- sanitary facilities
- hard hat sign(s)
- bulletin board with specific items posted
- stormwater permit, associated posting requirements, and notice-of-intent
- stormwater pollution prevent plan (SWPPP) and associated best management practices

- contractor's quality control plan
- identification and CO approval of several key players on the contractor's staff including the superintendent, safety officer, surveyor, and QC manager
- other items as required by the contract

The first item of business is for the contractor and the construction inspector to hold a tool box safety meeting. In this meeting, the contractor's safety plan is reviewed and emphasis is placed on job-specific safety issues. Other items that may be covered in this meeting include site maintenance, pollution control, and utilities. NRCS places the safety of the public, the contractor's personnel, and NRCS personnel at the forefront of concerns on any construction job. NRCS policy related to safety can be found in the General Manual, Title 110, Part 402 (GM 110–402) and in the NEM 503.

Materials

The materials that are to be incorporated into the work must be approved by the CO or the individual assigned by the CO, such as the engineer. Materials must be evaluated in relation to applicable industry standards and/or specifications to determine that they meet design requirements. Material quality is evaluated by one or more of the following procedures:

- results of laboratory testing performed by the NRCS, consulting firm, and commercial lab
- written certification from the manufacturer with test results attached
- material markings and tags
- examination and/or testing onsite

Final approval of vegetative materials should not be given until immediately before installation to ensure that the materials are alive, have been stored and handled properly, were harvested or grown correctly, and are in the specified condition for the project application.

QA activities and specific contract administration tasks

QA tasks must be performed at the field level. QA activities vary in accordance with the complexity and hazard class of the stream restoration project. For the more complex projects, projects being constructed under formal contract, and any project that requires substantial QA, a QAP must be prepared and used in accordance with the Natural Resources Conservation Service Acquisition Regulations (NRCSAR) and the NCGCAM. The QAP will identify the individuals with the expertise to perform various QA tasks, outline the frequency and timing of testing, estimate the contract completion date, and be co-approved by all responsible supervisors, SCE, and CO (Federal contracts) or administrative officer (non-Federal contracts).

Although it is advisable to have a written QAP, a written QAP is not required for jobs administered by an individual or landowner. In some instances, the QA inspector need only inspect the work at various stages or times during construction. For these instances, a checklist should be provided to the contractor and landowner that would list specific parts or stages of construction that will require QA inspection. The contractor or landowner should notify the inspector in advance of the need for inspection of those items.

The QAP defines NRCS QA duties including the following quality, quantity, and timeliness requirements:

- general description of the work
- items requiring inspection
- timing of inspections
- skills needed by inspectors
- number of staff hours
- equipment and facilities needed
- names and qualifications of personnel
- supervisor's statement of availability

The contractor is responsible for QC to ensure that the work installed meets the minimum requirements of the contract. QC is a bid item for most formal contracts and NRCS Construction Specification 94, Contractor Quality Control is included in the contract. For less formal work, the contractor's QC duties should be defined in a manner that will ensure contractor QC is performed to attain the desired quality of work.

The owner (NRCS or CLO as applicable) is responsible for QA activities including observing construction methods and procedures, reviewing QC testing activities, conducting material testing to evaluate the QC

program, and other measures to ensure compliance with contract provisions.

The performance of QA duties in an efficient economical manner requires:

- providing the proper number of qualified personnel with the knowledge, skills, and abilities necessary to conduct timely and effective inspection as outlined in the QAP
- continuous coordination with the contractor's QC representative to ensure NRCS QA activities are effective
- minimizing interference with the contractor's production activities

Under no circumstances will certification stating the work has been accomplished in compliance with the drawings, specifications, and other contract provisions occur without a physical review and documentation of the work performed. Continuous inspection is required for any activity the quality of which cannot be verified by intermittent inspection and for work that cannot be readily removed or replaced if it fails to meet the requirements of the contract. Intermittent or periodic inspection may be adequate for certain phases of project activities, depending on the complexity of the installation and potential impacts on the health and welfare of the public.

Documentation of construction activities and development of as-built plans is required for formal contract work and should be considered for other more informal work. The construction inspector maintains the official job diary, recording day to day activities and site and weather conditions. Written documentation should be supported by photo documentation. For more information on construction inspection, see NEH 645, and NCGCAM 517.5 through 517.13.

654.1506 Conclusion

Design, contracts and agreements, and installation are the three phases of project implementation. Consideration for specific aspects of the other phases must be given when working on a single phase in the installation process.

Quality planning is required for the efficient implementation of a project. A quality stream restoration planning effort requires an interdisciplinary team that can formulate a plan that is feasible, constructible, effectively addresses the identified problems, and meets the planned goals without adverse effects on the rest of the stream system. Planning provides the basis for the project implementation process.

The selected alternative plan that results from the planning process may range from simple actions to a complex of management and structural measures to achieve the goals of the project. Be aware that stream restoration design elements may include critical nonstructural approaches that may be integral to the success of the project.

Information that is gathered during the planning process and used to formulate a solution is analyzed in greater detail during design. The level of detail required in the design is dependent on the type of contract or agreement being used, complexity of the design, availability of experienced NRCS or CLO staff for QA activities or to direct the work if using equipment rental or similar types of contracts, and experience of potential contractors.

Designing a stream restoration project requires consideration of installation periods that can best be constructed in phases. Phases may require additional design to protect the work completed at each phase. Constructability should always be considered throughout the design. All of these considerations, as well as others, must be addressed since it is easier and often much less expensive to make changes during planning and design than during installation.

Various types of contracts and agreements are available for installing works of improvement that will permit accomplishing the work in the most beneficial manner to all concerned. In addition to formal

contracts, informal contracts and agreements are used in much of the work that is accomplished with cost-shared funds. In selecting the contracts and/or agreements to be used, careful consideration must be given to the type of work, amount of work, desires and capabilities of the sponsors and/or land user, and the interests of the NRCS. Planning and design decisions should be made with installation procedures in mind and consideration given to the availability of qualified personnel needed for construction oversight and agreement during all phases of a project.

NRCS requires QA for all levels of construction to ensure that projects are installed in accordance with the design, industry standards, and contract requirements. The contractor is responsible for QC to ensure that the work installed meets the minimum requirements of the contract. The owner is responsible for QA activities including items related to safety of the public, the contractor's workforce, and NRCS personnel. NRCS has standardized construction practices and procedures to ensure that stream restoration and other projects are installed according to design.