Application for a 2015-2017 Floodplains by Design Project Grant

Submitted applications will be rated to create a ranked list in support of
Ecology's FY 2015-2017 Floodplains by Design budget request.

Applications must be submitted electronically via email to Ecology by 5:00 pm, **September 8**, 2014. Send applications to:
Adam Sant at Adam.Sant@ecy.wa.gov
With the Subject line: **2015-2017 Floodplains by Design Project Grant Application**
You will receive confirmation that your application has been received by close of business on September 15.
Applicants must use this form as provided. No alterations will be accepted.

Project Title: **Downey Farmstead Restoration**

Organization/Jurisdiction Name: **City of Kent**
Contact Name: **Matt Knox**
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City, State, Zip Code: **Kent, WA 98032-5838**

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Legislative District(s): **33**
County: **King**
WRIA(s): **9**
Congressional District(s): **9**
Specific Project Location
Section **23** Township **22** Range **4** River Mile **between 21.5 and 22.3**
Latitude **47.37692246** Longitude **-122.26116225** GPS coordinates, if available
Major Watershed Project is in **Green-Duwamish Watershed**

Full project (or phase proposed herein) should be completed in 3-4 years.
Project Narrative and Budget are limited to 20 pages.
Scope of Work, Schedule, Maps and Photos can be in addition to those 20 pages.

1. Short Description of Project (500 words or less)

Please describe the overall goals for this floodplain area that is the focus of your proposal. Include in the description all major components of the project or activity such as breaching a levee, constructing a new levee, restoring a specific number of acres of floodplain, wetland creation or fill, restoration planting, project design planning, public process, or any other appropriate major component. Please indicate if funding is being requested for a phase of a larger multi-year project.

The primary goals of the Downey Farmstead Restoration project are: 1) To create new, low velocity side-channel habitat along the mainstem of the lower Green River to provide rearing and refuge habitat for juvenile salmon; 2) Reconnect the mainstem with a portion of the floodplain; 4) Create additional floodplain storage to help alleviate flood damage to nearby urban and agricultural areas; 5) Install anchored large woody debris and engineered log jams to help "jump-start" creation of complex salmon habitat and maintain hydraulic connectivity; 6) Reduce temperature loading in the Green River by planting native shrubs and trees along the river banks and 7) Maintain agricultural viability and recreational use by rebuilding a road along the far edge of the project site, rebuilding recreational parking and by reducing agricultural flooding.

The Downey Farmstead Restoration Project will excavate 1,875 linear feet (LF) of new, sinuous side-channel habitat and create 6.34 acres of intermittently inundated aquatic habitat (below the current ordinary high-water mark) adjacent to the Green River between river miles (RM) 21.5 and 22.0. This proposed side-channel network, constructed on a 22-acre site owned and maintained by the City of Kent, will be accessible to salmon approximately three-quarters of the year, but nearly 100% of the time during key juvenile salmon outmigration periods.

The new side-channel network will have four inlets at different invert elevations that all drain to one outlet maintaining a positive gradient throughout. This design provides a balance between providing river connectivity at low flows and more reliably transporting sediment through the side channels (which could generally be expected with a steeper gradient).

A total of 50 large-wood structures will be placed within the new channels and throughout the site. Nearly 7,000 native trees and willows and 22,000 shrubs will be planted along a north-facing stretch or the river that will provide stream temperature buffering to a temperature impaired waterway. Native plantings and invasive species eradication will improve water quality and provide erosion control and habitat for a myriad of aquatic and terrestrial wildlife species and insects.

Frager Road and recreational parking will be relocated away from the river's edge or further downstream to maximize available floodplain and floodplain habitat.

Removal of over 210,000 CY of material from the floodplain for creation of the side-channel network will provide over 130 acre-feet of additional floodplain storage and 16 acres of new riparian area. Peak flood levels will be reduced by up to six inches as a result of this project.

All design plans and analysis are completed as identified in question #9. All permits have been submitted and are completed or pending. The city invited all property owners in the Green River agricultural district near the project site and the public to an open house with mailings, newspaper articles and website announcements. Stakeholders involved with the project

design included Kent Parks and Recreation, the Muckleshoot Indian Tribe, WRIA 9 Forum members, and King County DNR.

Current plans call for construction to occur all in one phase during the construction season.

2. Flood hazard / risk reduction (*60 points*)

Describe your project and how it will reduce the magnitude or frequency of flood damages to people, structures or infrastructure. Projects will be evaluated on the significance of the flood hazard and the ability of the solution to address the hazard. Evidence of flood hazard reduction can be demonstrated via flood storage added (acre-feet), flood stage reduction [reduced BFE (base flood elevation)], conveyance increased (cubic ft/sec), sediment storage added or inputs reduced, number or value of structures and/or development rights removed from hazard area (# or areal extent), critical facilities removed from high hazard area, transportation and infrastructure facilities removed from high hazard areas, and other project-specific goals. Describe both upstream and downstream effects of your project.

The high level of development in the surrounding area and the degree of manipulation of the hydrology and drainage of the lower Green River have significantly impacted the hydrology and geomorphology of the project site and the river reach. The major human impacts, along with their hydrologic and geomorphic ramifications that contribute to flood hazard in the project area include:

- ***Deforestation and Large Wood Debris Removal*** **– Prior to development, the river valley was dominated by large evergreen and deciduous trees and brush. Clearing for agriculture and logging for timber virtually eliminated all riparian vegetation in the area. Loss of tree canopy has raised stream temperatures and dramatically reduced the supply of large wood for the stream channel. Wood acts to provide hydraulic complexity in the stream that salmonids are dependent on. From a geomorphic perspective, the loss of wood in the Green River channel has caused the channel to incise.**
- ***Levee Construction*** **– Most of the lower Green River has been leveed on both banks. Levees confine the sediment load, and increase flow velocity and bed shear stress in the channel. Levee construction also fixes the channel in place and eliminates channel avulsions (i.e., changing the course of the river).**
- ***Dam Construction*** **– The Howard Hanson Dam was completed in 1962 near the boundary between the Upper and Middle Green River subbasins. Since this time, peak flood flows and sediment supply have been substantially reduced leading to further incision and a decoupling of the river from its former floodplain.**
- ***White River Diversion*** **– The diversion of the White River to the Puyallup River at the beginning of the twentieth century has dramatically reduced the flow of water and sediment to the lower Green River. As much as 75 percent of the sediment delivered to the lower Green River prior to development came from the White River. Similar to construction of the dam, this diversion has caused the Green River channel to incise and disconnect from its floodplain, leaving salmon confined within a single channel.**
- ***Roadway Infrastructure*** **– Both Frager Road and SR 516 running along the south side of the river have road fill prisms associated with them. When the Green River overtops its banks, the road prisms interrupt connection of floodwater to the surrounding floodplain. Relocation of Frager Road allows reconnection of the floodplain on this project site.**

- ***Ditching and Impervious Surface Development*** **– The wetland areas to the southwest of the project site have been largely drained by ditching Mullen Slough (on the western boundary of the site) and its tributaries. Along with ditching, there is significant residential and commercial development in the Mullen Slough drainage basin. The impervious surface associated with that development has caused the flow of water to Mullen Slough to increase over predevelopment levels. There may also be an increase in flow in Mullen Slough from effluent from adjacent industrial and agricultural land uses.**

These impacts have caused the Green River to behave much more like a canal than a river in the project site vicinity. The muted hydrology limits the ability of the river to connect with the floodplain. Excavation of this project site will reconnect a half-linear mile and 16-acres of floodplain with the mainstem of the River.

The flood reduction benefit to upstream landowners is a key aspect of this project as it is located at the northern (most downstream) boundary of the King County Agricultural Production District. The city's consultant conducted a hydraulic and geomorphic analysis including thorough HEC/RAS modeling of the Downey Farmstead Restoration project site and upstream areas during the feasibility study in 2009. Their analysis concluded that the project will provide substantial flood reduction benefits to upstream farmers as well as to Kent and Auburn urban areas.

By excavating a side channel in this location, the project will create 6.3-acres of new floodplain (below the current ordinary high water mark) and provide 130 acre-feet of additional water storage that will locally reduce maximum flood water surface elevations by six inches during a 100-year flood event, reducing flooding to both upstream and downstream properties. The notable reduction in flood water surface elevation will propagate for miles upstream due to the flat gradient of the river. Lowered flood elevations are observed in the HEC/RAS model above RM 30 in Auburn and lowered flood elevations at the mouths of Mill Creek-Auburn and Mullen Slough will improve drainage from many farms. Because the valley is so flat, the project-induced reduction in flood water surface elevations will significantly reduce the total area inundated by a 100-year flood event and these benefits will extend upstream of the project site to the center of Auburn.

An aerial photo of the project site and upstream agricultural areas during the February 23, 2012 flood event (a 10,000 CFS, somewhat greater than a 2-year flood event) are presented with this grant application *(Attachment A)*. From this photo, it is evident that this event caused shallow ponding over many acres of agricultural land, disrupting activities and businesses. After completion of this project, it is expected that this area of inundation will be reduced markedly during similar flood events. The surrounding urban areas are typically higher and protected by levees on the right bank of the river, but during extreme events, the project will relieve pressure on the levees and enable greater flood protection to the urban areas on the north side of the river as well.

The peak flow velocities will also be substantially reduced in the project area. HEC-RAS modeling reveals that peak flow velocities during a 100-year storm will reduce by an average of 30% in the project reach due to this widening of the flood-plain. This will reduce erosion potential and the likelihood of surrounding levee failure.

The existing Frager Road will be moved and raised as part of this project. The current roadbed, built along the top of the left bank of the Green River within the project area, is at an elevation (~ 40' NAVD88) that is below the 100-year flood height of 42'. The new roadway is proposed to be built along the southern edge of the project site and raised up 3 feet above the 100-year height (to approximately 45'). This will result in a roadway that is removed from a high-hazard area that will allow passage of vehicles, bicycles and pedestrians through the project reach even during large flood events. This will also make the project more cost-effective as some of the excavated material will be able to be reused to raise the roadway (see question 6 below).

3. Floodplain ecosystem protection or restoration element (*60 points*)

Describe the ecological benefit of the project, its significance, and the ability of the solution to address the overall need in the project area or watershed. Examples include, but are not limited to, reconnecting floodplains, salmon recovery actions, habitat restoration, Channel Migration Zone protections, etc. Evidence of ecosystem benefits include floodplain (including estuary) habitat type (e.g., wetland, side channel, forest) and area restored (# acres), floodplain area protected from bank armoring (# of acres), floodplain area protected from development or other land use change (# acres), hardened bank removal or levee/riprap removal (linear feet), levee setbacks constructed (linear feet, # acres), new side channels or reconnection of old side channels (linear feet or storage volume), salmon species benefitted (# of listed, non-listed species). Secondary evidence includes culvert replaced to restore fish passage or increase conveyance, logjam and or wood structures installed, riparian area planted, and other project-specific goals.

Three federally listed fish species are present in the Green River. These species include Chinook (the most numerous listed species in the Green), winter-run steelhead, and bull trout. Other salmon species expected to benefit from the proposed project include chum, coho, cutthroat and pink. Pacific and river lamprey are federal species of concern and state monitor/candidate species (respectively) that are also expected to benefit.

Most indices of Green River fall Chinook populations show that the Green River population is in trouble. Puget Sound Chinook are the most numerous of the three listed salmon species in the Puget Sound Ecologically Significant Unit (ESU). The most recent NOAA status review (Ford, et al 2010) found that the 15-year trend (1995-2009) in natural-origin spawner abundance (one measure of salmon populations) was 0.95 – anything less than 1 means that the population is declining. The Habitat Limiting Factors (2000) analysis prepared for the Green River as part of the WRIA 9 Salmon Habitat Plan identified that juvenile refuge and rearing habitat was one of the most limiting factors for Chinook salmon in the lower Green River.

Chinook salmon fry require slow velocity habitats along mainstem river channels for rearing. Suitable habitats that provide these low-velocity conditions are found along natural channel banks and bars, with mainstem backwater areas providing the best conditions for Chinook rearing in larger rivers (Beechie et. al 2005). These types of habitats are currently very limited along the mainstem of the Green River due to levees, dikes, and other types of hydro modifications. These low-velocity habitats become particularly scarce during the higher flow periods that occur when Chinook are rearing in the river between early February through early June. These low velocity areas are essentially non-existent in mainstem areas that have armored banks such as much of the Lower Green. Due to the lack of these "holding" areas,

many fish are forced to migrate to the Puget Sound prior to obtaining adequate growth, and very few of these undersized fish return as adults (see reference below).

Data from the Green River screw trap operated by the Washington State Department of Fish and Wildlife at RM 32 for many years reveals that greater than 50% of the Chinook outmigrants from the middle Green River are small, fry-outmigrants. The Chinook that migrate to the estuary in the January to March timeframe are all wild Chinook. These small (35-45 mm) fish are those least capable of withstanding flood flows in the main stem of the river, and flows during this early period are typically higher *(Attachment B)*. Chinook fry that migrate to the Puget Sound without obtaining adequate growth in the riverine or estuary rearing habitats have very low marine survival rates comparatively. Studies conducted by NOAA Fisheries and SRSC (Greene et al. 2005) found that juveniles that rear for a significant amount of time (30 to 90 days) in riverine or estuary rearing areas have marine survival rates that are almost 10 times higher than that of fry that migrate directly into the Puget Sound. This means that the current scarcity of rearing habitats along the lower Green River can directly limit the number of returning adult Chinook salmon, since fry migrants have extremely low smolt-to-adult return rates (SARs). The lack of rearing habitat in the lower Green River and the estuary is the critical factor for producing viable smolts, and this project is critical for filling that need.

As mentioned earlier, this project has been designed to provide a sinuous, side-channel network that has four inlets all set at different invert elevations, draining to one central outlet channel with a constant downhill slope. Channel inlet and outlet elevations were determined through a collaborative process between the city, its consultant, the Muckleshoot Indian Tribe, King County Department of Natural Resources and Parks, and Water Resource Inventory Area #9 Implementation Technical Committee members (WRIA 9 ITC). This group settled on inlet elevations that would provide flow-through conditions consistently between October and June, which includes the period when salmon outmigrants are typically expected (see Attachment B). The design also struck a balance between providing river connectivity at low flows and more reliably transporting sediment through the side channel (which could generally be expected with a steeper gradient).

The proposed project will have gently sloping banks of approximately 5 H: 1 V over most of the site to maximize the amount of shallow edge habitat available to salmon during flood flows (i.e. for every foot rise in water level, an additional 5 horizontal feet will be inundated for flood refuge). The lowest part of the riverbank, however, will have 3 H: 1 V slopes to encourage overhanging vegetation at lower summer flows and to minimize the amount of area available for reed-canary grass colonization (typical in surrounding areas where hydrology is conducive). Steeper lower banks will also encourage sediment flushing at lower water levels by increasing low-flow stream velocity.

A total of 50 large wood structures are included in the project design. Large (43-log) engineered log jams are proposed at each of the three low-flow inlets to constrict the side channel opening size, encourage localized scour and flow-through, and 46 smaller (3-log) floodplain and side-channel structures and one low-flow eddy habitat structure are proposed to help promote formation of complex salmon habitat. These design elements were all designed to maximize the value of the project for juvenile salmonids. The low-flow eddy habitat structure is also expected to provide refuge and holding habitat for adult salmon as they migrate back to their spawning grounds in the middle Green River.

Over 29,000 native shrubs and trees are proposed to be planted along the banks of the Green River and along the new side-channels. These plants will substantially improve the streamside conditions for fish as well as many other species of wildlife, providing overhanging cover, leaf-litter, woody debris and "fuel" to diversify the food-chain. Removing the currently existing non-native species along the half-mile long edge of the project site along the Green River will open up areas to plant thousands of evergreen and deciduous trees.

The Department of Ecology in their 2011 Green River Temperature TMDL study (Pub. No. 11-10-046) found that summer temperatures in the Green are too warm to support proper habitat for fish and that shading was essential to improving river conditions. Shade provided by trees planted along this reach along the south side of the river are expected to improve shading in as little as five years, and will eventually shade most of the river within this reach for many hours each day.

This project is one of six active projects (either in feasibility, design, or construction) located within a five mile reach that will provide benefits to salmonid species. These projects will combine to create a benefit greater than the sum of each project. This project along with other off-channel habitat creation projects identified in *Attachment C* as well as current levee improvement and setback projects *(Attachment D)* will reconnect the former floodplain in a number of locations and drastically improve in-stream and riparian habitat conditions for fish in the lower Green. All together, these lower Green River projects will improve well over three miles of main-stem, side channel and off-channel Green River habitat in Kent –enough to make a significant difference in juvenile salmonid survival in the lower Green.

4. Is your project in a Puget Sound Partnership Priority Floodplain? *(5 points*)

(Deschutes, Dungeness, Duwamish/Green, Elwha, Hood Canal, Lake Washington, Lower Skagit, Nisqually, Nooksack, Puyallup, Sauk, Skokomish, Skykomish, Snohomish, Snoqualmie, Stillaguamish, Upper Skagit)

Yes – The project is identified in the WRIA 9 Green/Duwamish and Central Puget Sound Watershed as a priority project (Project LG-7) and is listed on the Three-Year Watershed Implementation Priorities list for the Puget Sound Salmon Recovery Plan.

The Downey Farmstead Restoration project will make important contributions towards meeting two targets in the Puget Sound Action Agenda: 1) Floodplains – By 2020, 15 percent of degraded floodplain areas are restored or floodplain projects to achieve that outcome are underway across Puget Sound and there is no additional loss of floodplain function in any Puget Sound watershed relative to a 2011 baseline; and 2) Land Cover and Land Development – By 2020, average annual loss of forested land cover to develop land-cover in non-federal lands is <1,000 acres per year and 269 miles of riparian vegetation are restored or restoration projects are underway .

5. Other benefits (*40 points*)

Describe how your project maintains or improves agricultural viability, water quality, public open space/recreation access, economic development, or other important local benefits or values, and does not conflict with other objectives of this program. Projects receive points based on the importance of the result produced, the ability of the solution to address the overall stakeholder need and the long-term improvement.

a. Agricultural viability (evidence of agricultural benefits include reductions in flooding (acres), protection from development (acres), improvement of drainage infrastructure (acres), or other

capital or non-capital benefits to agricultural productivity).

b. Water quality improvement [e.g., through stormwater infrastructure upgrades, treatment of a TMDL or 303(d) issue, reduction in sediment, restoration of wetlands or riparian areas, implementation of related best management practices, etc.].
c. Public access and recreation (e.g., through land acquisition, the development of trails or other recreational infrastructure, etc.)
d. Other floodplain values or services of local importance.

- **Agricultural Viability: A total of 210,000 CY of fill will be removed from the floodplain which will increase floodplain storage by 130 acre-feet, create 16 acres of new floodplain and result in decreased flooding levels from RM 21 – 30 (up to six inches of decrease during the 100-year storm event);**
    - **545 acres of farmland in the immediate area will experience reduced flooding;**
    - **The Downey Farmstead site will be restored and protected into perpetuity keeping this site off-limits from future development and providing flood benefits for the long-term.**
    - **Frager Road will be relocated away from the river's edge but built to current road standards and above the 100-year flood level. During outreach for this project, adjacent agricultural landowners conveyed the importance of this roadway to their businesses – keeping the road open and allowing deliveries and pick-ups from either direction even during the wet-season was emphasized as especially important.**

- **Reduction in temperature loading and Green River water temperatures: The Green River in the project area is currently on EPA's 303(d) list of impaired waters for temperature and dissolved oxygen. A TMDL study completed by the Washington State Department of Ecology in 2011 (Pub. No. 11-10-046) found that summer water temperatures in the "Middle and Lower Green River are too warm to support proper habitat for the fish that use these waters for migration, spawning and rearing. " Monitoring and modeling conducted for this report found that an extreme shade deficit along the river banks existed downstream of Auburn. As mentioned above, over 29,000 native plants including 7,000 trees are proposed to be planted along the banks of the Green River and along the new side channels. It is expected that these streamside plantings will drastically improve shading along this ½ mile long, south-facing river reach. Currently, the river banks in this reach are predominantly covered with reed-canary grass and Himalayan blackberry. Clearing and plantings proposed with this project are expected to improve river shading in as little as 5-years. In conjunction with the other projects identified in Attachments C & D, river shading is expected to improve dramatically in the near future, and this is expected to lead to decreased water temperatures.**

- **Publc Access: The Muckleshoot Indian Tribe (MIT) identified that the Downey Farmstead reach is an important treaty fishing activity area. Project designers worked with the MIT to design the project to maintain access to the water's edge and to provide roadside parking and fishing features.**

- **Recreation: City of Kent Parks identified that the existing Frager Road is an**

important corridor for bicyclists and pedestrians and that the section of road through the project site forms one of the key loop trails identified in the recent Kent Valley Loop Trail Master Plan (2013). The current road design is being reviewed by Parks Department consultants to ensure that it is as safe as possible for non-motorized recreationists. It is expected that small revisions may be recommended that will be explored further including: Adding vehicle speed bumps; Road striping and signage to emphasize a shared-use path; and softening the corner just north of Highway 516. Replacement parking for recreationists (to replace that which is needed for habitat enhancements) will be provided further downstream near the Old Fishing Hole Park where Parks staff can more easily police and oversee the parking area in hopes that unlawful parking lot activity will be reduced.

- **Support for Climate Change Research: Climate change could affect this project in a number of ways including:**
  - **Flooding – climate change models predict that heavy precipitation events and lower Green River basin flooding risks will increase.**
  - **Flood Inundation depth and area: These are also expected to increase in the future;**
  - **Sediment loads: Transport of sediment due to increased and more frequent flooding could negatively impact the project site;**
  - **Summer low flows – These are expected to decline due to a reduced mountain snow-pack and warmer temperatures.**
  - **Water temperatures / Water quality. Lower summertime flows could exacerbate already warm Lower Green River temperatures.**

  The City of Kent intends to collaborate with NOAA, the UW Climate Impacts Group and other partners to evaluate and quantify climate change impacts that could affect the Downey Farmstead project design and implementation.

6. Cost-effectiveness (*20 points*)

a. Project will be judged on whether the budget is appropriate to the project scope, and designed for project success.

The current floodplain of the Green River is perched well above the historic floodplain due to the diversion of the White River for flood control reasons in 1906 and the construction of the Howard Hanson Dam in 1962. Since these changes, the Green River has incised considerably due to a reduced sediment load and reduction in flood size and extent. This incised channel means that reconnecting the river with the floodplain requires extensive digging and therefore cost.

The original conceptual plan for this project had a single meandering channel through the project area. An early alternative dug out much more material (approximately 400,000 CY) and created a single thread with broad benches, but steep slopes back up to the existing grade. The multiple inlets with shallow slopes (5:1) concept (the current plan) developed as a result of concern over sedimentation and the potential for channel blockage as well as a concern that the broad-bench concept was too expensive due to the massive amount of excavation. Also, stakeholders noted that there is currently much steep-walled habitat along the edges of the Green, but very little with shallower slopes. More shallowly sloped sidewalls are preferred because

they provide more salmon refuge habitat at different water surface elevations and are more stable than steep-walled sides.

The current design utilizes a multiple thread concept and digs down deeper than earlier designs to maintain flow-through for more of the year. It maintains relatively shallow slopes (typically 5:1), but is more affordable than the broad-bench concept. The multiple inlet levels were designed into this last iteration to increase variability, improve juvenile salmon rearing opportunities and encourage different habitat niches at differing flow levels.

On this project, over 20' of overburden will be removed to get down to the level that will provide most benefit for juvenile salmonids. To reduce hauling and disposal costs, 22,000 cubic yards of material will be reused on-site to raise the level of Frager Road to keep it above water through the project area during a 100-year flood event. Containerized plants for this project will also be propagated and grown in the city's native plant nursery to reduce costs, and city staff skilled in restoration will provide long-term maintenance and adaptive management to the site.

With current flood control provided by the Howard Hanson Dam and levees up and down the Lower Green, the river currently has very little capacity to create or maintain side channels that at one time were estimated to provide one-third of the total channel area in the Lower Green River Subwatershed and 62% of the channel edge (Collins and Sheikh 2005). As mentioned above, this habitat type in the Lower Green is currently almost non-existent and critical to recovery of the Chinook. Reconnection of this floodplain requires extensive excavation but is essential to improving mainstem and off channel habitats, which are necessary to increase juvenile rearing, life stage diversity, and productivity.

The Downey project provides this necessary floodplain habitat during critical periods for juvenile salmonids. The project design reduces costs where possible and utilizes existing city resources (i.e. its native plant nursery and maintenance personnel and expertise) to stretch project dollars.

b. Describe how the project will be continued or maintained after the grant has been completed.

The City of Kent will provide stewardship and maintenance of this property which is under city ownership. 2-years of maintenance including weeding and irrigation will be required in the construction contract, and city vegetation specialists and operations staff will oversee maintenance for the longer term. This safeguard, overseen by city construction inspectors and its environmental ecologist, will ensure that weeds do not gain a foothold on the project site before planted woody plants have a chance to establish, and dedicated city staff will ensure long-term stewardship of the site and compliance with native vegetation and hydrology/fish access performance standards.

City staff qualified in stream and wetland restoration and maintenance will monitor and maintain this property following the guidelines and requirements for critical areas and according to the provisions of the maintenance and monitoring plan agreed to for this project (see Draft Maintenance and Monitoring Plan – Attachment J). As-built drawings will be completed immediately after construction completion to serve as a reference and baseline for future monitoring.

The Draft Monitoring, Maintenance and Adaptive Management Plan specifies that vegetation establishment, invasive species, hydrology/fish access and fish use be monitored at years 1, 2, 3, 5, 7, and 10 after construction completion. It also directs maintenance checks and actions that will be taken and adaptive management options to consider if performance targets are not being met. These actions and responses as well as yearly reports are expected to be required by regulatory agencies once all permits are issued. In order to maintain compliance with these permits and to be good stewards of this land, regular maintenance visits will continue even after all permit requirements are completed.

Interpretive signage and wildlife passable fencing will be installed along the edge of the new roadway to provide information and education about the project, yet limit access to the site. Site access will be maintained for Muckleshoot Tribal treaty-protected fishing activities.

c. If project cannot be fully funded, explain how the project could be scaled downward.

Current plans call for all construction to occur in one-phase during the summer construction season. However, if funding dictates that the project be phased, there may be opportunities to split construction into two or three phases, likely starting with construction of the downstream outlet channel (which would function as an off-channel backwater area until upstream connections were made), or constructing the middle section in a first-phase, leaving plugs at the inlets and outlets for future construction phases. Relocating Frager Road from its current position along the banks of the Green River to the southern property boundary parallel to SR 516 would be the first task to complete. If the channel was not excavated in this phase, importing fill to use beneath the new roadway would likely result in additional costs.

Scaling down the project would require a redesign and concurrence from all the funding partners and stakeholders, and would compromise the goals of the project (identified in #1 above).

7. Long-term cost avoidance: (*30 points*)

a. Describe how your project minimizes or eliminates future costs for maintenance, operation, or emergency response. (***15 points***)

The city currently provides maintenance of the project site, mowing vegetation and removing Himalayan blackberry and other invasive vegetation to keep it under control and help deter homeless encampments. The city has also had to remove and dispose of illegally dumped materials, especially at the current parking area. The project, once constructed, will reduce or eliminate these costs, and the problematic parking area will be relocated to an area more easily patrolled by City Parks and Police staff.

Maintenance and operational costs will be minimized by:

1. **Design of landscaping and on-going maintenance to minimize recolonization by non-natives;**
2. **Design of engineered log jams to encourage scouring and natural maintenance of**

channel openings;

3. **Incorporation of maintenance paths to provide access in case unacceptable sedimentation occurs or adaptive management dictates that future corrections are needed;**
4. **Consistent, early maintenance will be mandated and directed by the Monitoring, Maintenance and Adaptive Management Plan and will be targeted to meet performance standards; Meeting these performance standards will, in-turn, reduce long term maintenance as invasive species encroachment will be minimized and design goals will be realized.**
5. **Emergency response to and through this area will be improved, as the new roadway will be constructed to current standards and will be built above the 100-year flood height.**

b. Describe how your project accounts for expected future changes to hydrology, sediment regimes, or water supply resulting from other floodplain management efforts, land use changes, extreme weather events, or other causes. **(*15 points*)**

- **Redundant openings provide more assurance that sediment accumulations will not block side-channel habitat;**
- **Maintenance access ramps are proposed to respond to unacceptable project changes or sediment accumulation that may endanger the roadway, bridge or habitat infrastructure;**
- **Increased flood storage will make the immediate area more resistant to extreme weather and extreme flood events;**
- **Other nearby habitat and levee improvement projects (see attachment C & D) will all reduce the likelihood of flooding, and provide additional area for sediment to settle.**
- **Regional monitoring proposed by the WRIA 9 Forum for this and other nearby projects will help determine if project corrections or tweaks are needed to improve salmon benefit.**

8. Demonstration of need and support (*30 points*)

a. Describe how your project is consistent with the intent of existing floodplain management or habitat recovery plans or is specifically identified through existing plans or work programs. (Elements of the project may have been developed through more than one planning process. Please identify the planning process used for each major element if they are not from a common plan.) ***(15 points*)**

This project is identified in the WRIA 9 Green/Duwamish and Central Puget Sound Watershed Salmon Habitat Plan (SHP) – August 2005, as a priority project-Lower Mullen Slough Restoration (LG-7). The three-year work plan for WRIA 9 also includes this project as one of its high priority projects.

The project was devised specifically to address the Tier 1 Conservation Hypothesis for the Lower Green River in the SHP - Creating side-channel habitat to provide rearing, flood refuge and over-wintering habitat for salmon and reconnecting and restoring the floodplain. Other goals of the SHP that this project addresses includes: 1) Installing anchored large woody debris; 2) Improving bank conditions and creating

shallow, vegetated benches; and 3) Controlling invasive plant species and planting native plants. All of these measures will increase habitat complexity and increase the likelihood of attaining project goals.

King County's Comprehensive Plan policy R-648 states that aquatic habitat restoration projects or floodplain restoration projects are allowed on agricultural lands that are unsuitable for direct agricultural production. This includes portions of property that have not historically been farmed due to soil conditions or frequent flooding. The Downey farmstead site has not been farmed recently due to soil conditions and frequent flooding, and it cannot be returned to productivity by drainage maintenance. Also, the proposed project will result in a net benefit to agricultural productivity in the area due to a reduction in flooding. The Downey Farmstead Restoration project received approval from the King County Agriculture Procedures Committee (APC) as the project proposal is in compliance with King County Code 21.A.24.381 (*Attachment E*).

The King County 2009 Farms Report, page 37, states: *"The safest and most cost-effective way to manage a floodplain is to avoid levees and revetments and allow as much space as possible for the river to run. The wider the river corridor, the greater the storage and conveyance capacity, the greater the protection afforded to adjacent lands, and the lower the maintenance costs of the levees. In addition to flood management benefits, there are significant fish habitat improvements that result from removal or setbacks of levees."*

b. Describe which flood control authorities, Tribal Nations, local governments, lead entities, key stakeholders or decision-makers representing floodplain interests located within the river reach or affected by the project have provided letters of support explicitly endorsing the project and its outcomes for their interests. (***15 points***)

WRIA 9 Implementation Technical Committee, King County Department of Natural Resources and Parks, City of Kent Parks and Muckleshoot Indian Tribe biologists and staff assisted the city and its consultant in design of this project. Their letters of support are contained at Attachments F and M. Letters of support from Parks and the MIT will be provided prior to September 22nd.

9. Readiness to proceed and complete the proposed phase of the project (*25 points)*

Describe how your project is ready to proceed with the scope of work, and your capacity to complete the project successfully and maintain it over time, including your project schedule and deliverables. Describe your experience with similar projects. If your project is acquisition only, describe how you will complete floodplain restoration subsequent to the acquisition.

This project is shovel-ready, has been thoroughly reviewed and designed for success. All design plans and a thorough design analysis has been completed. Analysis' and completed products include the following: 1) A feasibility study; 2) Conceptual and final (100%) design plans (*Attachment N*); 3)A final design report that includes a hydraulic analysis, scour analysis, geotechnical analysis, large wood structural stability analysis and pile analysis; 4) Construction quantities and cost estimate; 5) Contract bidding documents and general contract conditions (*Attachment G*); 6) Cultural resources inventory report; 7) Wetland and stream delineation and report; 8) Draft Maintenance and Adaptive Management Plan (*Attachment J*); 9) SEPA and HPA completed permits; 10) Corps of

Engineers Section 404 including Section 106-cultural resources consultation, Aquatic Use Permit and King County permits, including road vacation, clearing and grading and CAO have been submitted - approvals are pending. Stakeholders involved in the project design included Kent Parks and Recreation Department, Muckleshoot Indian Tribe, WRIA 9 Forum members, King County DNR, and adjacent agricultural landowners. Regulators and historical agencies were also consulted. Public meetings were held to gather public input on the project design.

The city has developed and managed similar projects up and down the Green River. The City and Corps of Engineers recently partnered to complete the Riverview Park Ecosystem Restoration. This project created a 700 foot long side-channel to the Green River which included engineered log jams and thousands of native plantings at RM 23.7. The city also recently completed design and permitting of the Leber Homestead Restoration project. Phase I of construction (clearing, grubbing and planting of understory) will begin in September of 2014.

A number of large levee setback projects (see Attachment D) are currently underway which will create floodplain fish habitat and enhanced riparian areas along the banks of the main stem. The city employs construction inspectors, engineers, biologists and project managers with extensive experience managing large and complex projects. The city employs maintenance staff with years of experience maintaining native restoration sites and mitigation areas.

10. Pilot project and leverage opportunities *(25 points)*

a. If applicable, describe how your project could serve as a pilot effort or result in changes or results with broader impacts to the state. ***(10 points)***

- **Monitoring efforts by WRIA 9 have been organized and will soon monitor baseline conditions at this as well as other current and future restoration locations along the Lower Green. If site specific monitoring or regional monitoring indicate areas that need improvement, this as well as other restoration sites will be altered and/or adaptively managed as needed to improve functionality and success.**

- **The City of Kent intends to collaborate with NOAA and other climate experts and partners to quantify and evaluate the impacts of climate change on this project. The city has identified a number of climate change parameters that may affect this project (see #5 above). Adaptive management recommendations from this group may help improve not only this project, but also future salmon restoration and habitat enhancement projects in the Lower Green River.**

b. If applicable, describe how your project leverages existing investments, such as SRFB, FCZDs, Dike Districts, TMDLs, WWRP, ESRP, NEP, and other funding sources. Evidence of this will be based on the amount and diversity of the leveraged funding sources. ***(10 points)***

To date, the project has received the following funding:

- **Conservation Futures Tax: 2008 – $94,000 to purchase site properties;**
- **King Conservation District: 2007 – $85,961 for demolition and clean-up;**

- **King Conservation District: 2012 – $46,419 funding for final design and permitting;**
- **Salmon Recovery Funding Board: 2007 – $1,035,085 to purchase site properties;**
- **Salmon Recovery Funding Board: 2008 – $131,569 for feasibility study & 30% design;**
- **Salmon Recovery Funding Board (PSAR): 2011 – $253,581 for final design & permitting;**
- **City of Kent: 1996 – $30,000 to purchase parcel from Green River Flood Control District;**
- **City of Kent: 2008 – $281,334 to purchase site properties;**

c. If applicable, describe how your project addresses inequity or social justice issue by benefitting underserved communities. ***(5 points)***

This project improves flood protection for the Lower Green River Agricultural Production District, a district which has been increasingly confined and restricted by surrounding urban development and land uses.

11. Budget (See Attachment H).

Task	Amount Requested from Ecology*	Other Funding for Project** (20% of Total Cost Minimum)	Total Cost
Task 1 — Administration, Construction Inspection, Project Management, Tax	**$ 928,372**	**$ 232,093**	**$ 1,160,465**
Task 2 — Channel reconfiguration and connectivity	**$ 2,715,541**	**$ 678,886**	**$ 3,394,427**
Task 3 — Channel structures and placement	**$ 529,806**	**$ 132,452**	**$ 662,258**
Task 4 — Streambank Stabilization	**$ 95,568**	**$ 23,892**	**$ 119,460**
Task 5 — Riparian plantings	**$ 186,661**	**$ 46,666**	**$ 233,327**
Task 6 — Riparian (invasive) plant removal and site clearing	**$ 98,792**	**$ 24,699**	**$ 123,491**
	$ 181,200	**$ 45,300**	**$ 226,500**

Task 7 — General Restoration Activities			
Total Project Cost	**$ 4,735,940**	**$ 1,183,988**	**$ 5,919,928**

*Amount requested from Ecology under this grant program
**Other sources of funding dedicated to this project. Insert narrative below that details what the source of funding is and whether or not it has been received or applied for but not yet received. Match must be at least 20% of Total Project cost.

Narrative and/or Table of other funding sources for project, here:

Other funding sources dedicated to this project include Salmon Recovery Funding Board (applied for) and City of Kent (budgeted). For construction bid specifications and an itemized cost estimate, see *Attachment G & H*.

If it's not possible to fully fund this proposal, please describe a *phased* approach that would still significantly advance the effort:

Current plans call for all construction to occur in one-phase during the summer construction season. However, if funding dictates that the project be split-up, there may be opportunities to split construction into two or three phases, likely starting with construction of the downstream outlet channel (which would function as an off-channel backwater area until upstream connections were made), or constructing the middle section in a first-phase, leaving plugs at the inlets and outlets for future construction phases.

12. SCOPE OF WORK: Please attach a Scope of Work and schedule. If your proposal is a phase of a larger multi-year project, please place this proposal in the context of the overall project and provide preliminary cost projects to complete the project.

The following construction schedule and sequencing is expected (dependent on available funding):

- **February, 2017 – Bid construction project;**
- **March, 2017 – Award construction contract;**
- **April - June, 2017 – Mobilize, set-up erosion control, clear and grub site, excavate and stockpile interior topsoil, excavate and place suitable road embankment material, import additional embankment, prepare subgrade for new Frager Road, pave new roadway, demolish old roadway and bridge abutment and begin excavation and haul for new side channels; Bid and pave new parking lot.**
- **July – August, 2017 – Install work area isolation barriers and complete channel excavation down to design depths; Also install engineered log jams, low-flow eddy habitat structure and floodplain and side-channel habitat structures. Remove isolation barriers by the end August (window for in-water work);**
- **September – October, 2017. Hydroseed project site and plant native vegetation;**

- **November, 2017 – complete road accoutrements including guardrail, striping, signage; project demobilization.**

13. **Maps:** Please attach at least two (2) maps to your application. The first map should be a vicinity map and the second should be a map of your project.

See Attachment I

14. **Planting Maintenance/Survival:** If your project includes plantings, please provide a description of how you will ensure plant survival and maintenance.

See Attachment J – Draft Monitoring, Maintenance and Adaptive Management Plan

15. **Photos:** Photos are not required, but if you think they enhance our understanding of your application, please include them. We are particularly interested in *"before"* photos that can be matched with *"after"* photos.

See Attachment K

16. **Executive order 05-05, Archaeological and Cultural Resources** (online at http://www.governor.wa.gov/office/execorders/eoarchive/eo_05-05.pdf) directs state agencies to review all capital construction projects for potential impacts to cultural resources to make sure that reasonable action is taken to avoid adverse impacts to these resources. If this grant program is funded by the 2015 Legislature, successful grant applicants will be required to submit additional information to Ecology to comply with this Executive Order.

The Corps of Engineers Section 404 including Section 106 (cultural resources inventory report) has been submitted. A Draft Cultural Resources Discovery Form has been prepared to be used during project construction *(Attachment L)*.

Additional factors in ranking and award: This is a very new funding source. To ensure that projects meet the objectives of the program, these additional factors will be considered in creating the proposed funding list:

- **Balance of project types:** Balance funding ready-to-proceed construction projects with funding pre-construction activities. This balance in project types is vital to ensuring success over time.
- **Geography:** There is strong interest in ensuring that projects in all areas of the state receive funding.
- **Advancing multi-benefit floodplain management:** It is important that the project list advance the principles and practical application of multi-benefit floodplain management.