Reforestation Strategy Table: Forest Management Plan for FMA 6900016 **March 2011**

Regenerated Yield Trajectory (leading + secondary species)	Strata Standard (C, CD, DC, D)	Transitions Toward Climax	Species Proportions	Limitations to Crop Establishment	Silviculture System	Site Prep	Seedling Establishment (includes LFN)	Seedling Density	Reforestation Phase Intervention
WEYG01 D	D	Establish and grow as a deciduous stand at C/D densities	>80% Aw, Pb or Bw by stocking at Establishment and by crown closure/density at Performance. Associated coniferous understory will be maintained on a landscape level through understory avoidance.	Cold, wet soils, competition (grass, forbs), possible low suckering potential, insects and disease, deep duff, soil compaction	Clearcut, clearcut with retention.	Typically no site prep required. May require debris management tactics.	LFN for suckering in deciduous; may plant conifer where objectives are to replace harvested secondary conifer volume on the landscape or reforest areas affected by compaction that do not regenerate from onsite deciduous suckering.	The objective and intent is to obtain Initial seedling densities >10,000 sph to take advantage of natural growth dynamics of pioneer deciduous and capture site to reduce effects of competition	None anticipated. Possible in-fill planting with coniferous if non-productive voids appear.
WEYG02 Sx/Hwd	CD	Establish and grow as a spruce-leading mixedwood stand at C/D densities	> 49% Sw, >29% D species (Aw, Pb, Bw) by stocking at Establishment and by crown closure/density at Performance based on original AVI label	Cold, wet soils, competition (shrubs, grass, forbs), possible low suckering potential, insects and disease, deep duff, soil compaction. Drier sites with coarse soils may lead to low suckering potential. Deciduous domination of overstory canopy may reduce spruce growth & survival.	Clearcut, clearcut with retention; understory protection where feasible	For coniferous, create elevated microsite in wetter soils; may opt for no site prep treatment in drier soils; may choose to use mechanical site prep to limit deciduous suckering while exposing mineral soil or elevating microsite for coniferous. May use chemical site prep with Arsenal to improve Sw growth/survival during establishment phase.	Plant Sw on site prep microsite or may straight-plant Sw in drier soils. LFN for deciduous suckering	1200 sph of Sw to minimize effects of mortality or to fully utilize single microsites; > 10,000 sph deciduous natural suckering should be expected as early establishment densities	If deciduous proportion is over-achieved to the detriment of the projected CD proportion or the survival and/or productivity of the coniferous, reduce deciduous component with stand tending intervention; tending may also be required to reduce grass or shrub competition; if coniferous proportion targets are underachieved or coniferous mortality is significant, may need to fill-in plant Sw
WEYG03 Px/Hwd	CD	Establish and grow as a conifer-leading mixedwood stand at C/D densities	> 49% conifer (Pl leading), >29% D species (Aw, Pb, Bw) by stocking at Establishment and by crown closure/density at Performance based on original AVI label	Some sites may experience cold, wet soils from rising soil water after harvest, contributing to significant vegetative competition (shrubs, grass, forbs) and possible restricted suckering potential. Pine-leading mixedwood stands are typically a drier moisture regime, with increased potential for effects of drought & lower deciduous suckering potential. Pine species are intolerant and may exhibit increased mortality and lower productivity in association with hardwood species grown on the same site; past insect and disease on the site may affect Pine regenerating stands (esp Armillaria).	Clearcut, clearcut with retention; understory protection where feasible	For coniferous, create elevated microsite in wetter soils; may opt for no site prep treatment in drier soils; may choose to use mechanical site prep to limit deciduous suckering while exposing mineral soil or elevating microsite for coniferous.	Plant Pl or Sw on site prep microsite or may straight-plant Pl or Sw on drier soils. LFN for deciduous suckering. Opting for LFN in a Pine-leading mixedwood risks the long term maintenance of the Pine component in these stand types.	1200 sph (Pl leading) to minimize the effects of mortality and immediately capture as much of the site as possible prior to the proliferation and crown closure of the deciduous component	If deciduous proportion is over-achieved to the detriment of the projected CD proportion or the survival and/or productivity of the coniferous, reduce deciduous component with stand tending intervention; tending may also be required to reduce grass or shrub competition; if coniferous proportion targets are underachieved or coniferous mortality is significant, may need to fill-in plant conifer
WEYG04 Sx	C	Establish and grow as a pure coniferous stand at C/D densities	> 80% Sw leading with other conifer; < 20% D species (Aw, Pb, Bw) by stocking in Establishment and by crown closure/density at Performance based on original AVI label	White spruce-pure stands tend towards the mesic to subhygric, medium to rich, in the Boreal. Cold, wet soils may result from rising ground water after harvest or imperfect drainage over clay horizons. Wetter soils may also increase competition (deciduous, shrubs, grass, & forbs). Insects and disease and soil compaction from operations and anthropogenic disturbance are other factors limiting growth	Clearcut, clearcut with retention, understory protection where feasible	For coniferous, create elevated microsite in wetter soils; may opt for no site prep treatment in drier soils with shallow duff; may choose to use mechanical site prep to limit deciduous suckering while exposing mineral soil or elevating microsite for coniferous.	Plant Sw on elevated microsites; may also plant Pine if found onsite originally. Straight-plant Sw on drier sites with duff >10cm.	1400 sph to minimize the effects of mortality or plant as many single microsites (mounds) as were achieved.	Deciduous and grass competition may be a factor affecting survival and proportion of Sw in the regenerating pure stand. A stand tending intervention may be required to setback calamagrostis or to reduce or eliminate deciduous suckering that may have over-achieved from a minimal deciduous content of the parent stand.
WEYG05 Px	C	Establish and grow as a pure coniferous stand at C/D densities	> 80% Pl leading with other conifer; < 20% D species (Aw, Pb, Bw) by stocking in Establishment and by crown closure/density at Performance based on original AVI label	Potential for drought conditions on coarse-textured well-drained soils. In association with Sb, the sites tend towards mesic,with some areas of heavy grass & shrub competition. The mesic sites may experience cold, wet soils from rising soil water after harvest. Insects and disease create a higher mortality potential in Pine	Clearcut, clearcut with retention.	Drag or lightly scarify (disc trench) for mixing and exposure of mineral soil and distribution of cone-bearing branches left as slash in the LFN prescription. May choose a small elevated microsite on the more mesic or colder soils	LFN for Pine based on good results from cone surveys. Plant Pl or Sw on sites with lower cone counts for less risk of mortality or failed germination, creating greater opportunity for establishment.	1400 sph for planting. If choosing LFN-for-seed, and the result is under-achieved (full site coverage, consistent germination and survival), then may choose to fill-plant at a later time	Grass, low brush and deciduous competition may affect the regenerating stand, esp in CM and LF. May choose, on a site specific basis, to tend competition if directly contributing to Pine crop-tree mortality or productivity; Fill-in planting of conifer if required, depending on significance of cumulative mortality
WEYG06 Sb	C	Establish and grow as a pure coniferous stand at C/D densities	> 80% conifer (Sb leading); < 20% D species (Aw, Pb, Bw) by stocking in Establishment and by crown closure/density at Performance based on original AVI label	Sb-pure stands tend towards a wetter moisture regime in the Boreal. Rising water table and/or imperfect/poor drainage, wet, cold soils, low nutrient regime, significant vegetative competition (grass, forbs), deep duff, shallow rooting leading to higher windthrow potential, soil compaction from operations and anthropogenic disturbance	Clearcut, clearcut with retention	Create elevated microsite in wetter soils with deep duff; may choose to use mechanical site prep to limit deciduous suckering while exposing mineral soil or elevating microsite for coniferous. No site prep required on drier sites with <10cm duff depth.	Plant Sb on site prep microsite or may straight-plant Sb in drier soils.	1400 sph to minimize the effects of mortality or plant as many single microsites (mounds) as were achieved.	Deciduous competition is not anticipated on these sites to the detriment of conifer growth and productivity. There may be a need to intervene to setback competition from calmagrostis, which would likely be accomplished using chemical herbicides in the early stages of treatment.

Column Explanations/expectations:

1. **Regenerated Yield Trajectory:** Based on ARS MAI standards for FMA 6900016 (Weyerhaeuser Company Ltd., Grande Prairie)

2. **Strata Standard:** C, CD, DC and D is a passive label/designation for pure and mixedwood stands, showing species group leading. The Regenerated Yield Trajectory is commonly translated into one of these strata standards.
3. **Transitions Towards Climax:** Will the regenerated stand move through another stand structure before ending up at what's projected? Will the original natural stand transition to an different regenerated yield trajectory? May have implications on future cut calculations, balancing and initial silviculture prescriptions.

4. **Species Proportions:** The target proportion of coniferous and deciduous in the regenerated stand based on a standard or productivity objective set out in the TSA assumptions.

5. **Climatic/Site Limitations:** The factors in climate and on the site that are expected to significantly increase the risk of NOT reaching establishment of the regenerated stand (survival) or the regenerated yield objective (productivity). This will contribute to the justification (good science) for the treatments chosen.

6 **Silviculture System:** Could be clearcut, shelterwood, seed-tree, partial cut, understory protection. Choosing a silviculture system as a strategy should be about working with the regenerative silvics of the species to be reforested, operational delivery logistics and productivity objectives.

7. **Site Prep:** Operational site treatment strategies to alleviate site or climatic limitations and/or species to be established. Could be raised bed, drag, mixing and sometimes chemical.

8. **Seedling Establishment:** The operational strategy to introduce the seedling to the site. Includes planting, artificial seeding, *Leave-for-Natural* (LFN).

9. **Seedling Density:** An operational strategy that is applied to achieve full site coverage (stocking/density targets) in the initial stages of regeneration in order to reduce the effects of mortality on the objective. May also be a target set as a minimum objective reached during the *Reforestation Phase* (first 14 years after harvest) and used as an early target in an Alternative Regeneration Standard (ARS) objective, a surrogate measure of early productivity.

10. **Reforestation Phase Intervention:** The *Reforestation Phase* is Year 0 to Year 14. The objective is to get the regenerated stand to the *Performance Stage* . In the *Reforestation Phase* there is the *Establishment Stage* and *Performance Stage* and in each of these stages one might choose some type of intervention to ensure the objective is reached. This could include herbicide (chemical or mechanical) for grass, herbicide for competition, fill-in-plant for mortality, etc.