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----- Document Approvals -----		Date (YYYY/MM/DD)		STND – 002		
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1. Definitions

- Standard Starting Resources – Prior to application of civilization-specific bonuses:
  - For non-nomad maps: 200 of each resource: food, wood, gold, and stone.
  - For nomad maps: 200 food, 375 wood, 200 gold, and 300 stone.

- Nomad – A map where players do not start with a Town-Center.

- Rule Changes – Invisible alterations to game mechanics which cannot be immediately and exactly quantified by players as the match unfolds, but still impact play. For example giving boars twice as much food is not a "Rule Change" because players can click on the boar to see how much food it contains. Doubling the rate at which food is gathered from boars is considered a rule change, because such a mechanic is not immediately obvious to players, and cannot be inspected during play.

- Build Time – The amount of time required for a single villager to construct a building, prior to application of civilization bonuses.

- Design-Critical Terrains – Surfaces introducing different game-play mechanics, defined in Table 1 below:

CLASS	Walk-Able?	Navigable?	Buildable?	Resources?	Examples
ICE	Yes	No	No	No	ICE, DLC_ROCK, DLC_BOGLAND
GROUND	Yes	No	Yes	Yes	GRASS, DESERT, SNOW
BEACH	Yes	Yes	Only Walls/ Docks	No	BEACH, DLC_WETBEACH, DLC_GRAVELBEACH
SHALLOW	Yes	Yes	No	No	SHALLOW, DLC_NEWSHALLOW, MUDDY_SHALLOW
WATER	No	Yes	No	No	WATER, MED_WATER, DEEP_WATER
MANGROVE	Yes	Yes	Yes	Yes	DLC_MANGROVESHALLOW, DLC_MANGROVEFOREST

Table 1: Design-Critical Terrain Classes in Age of Empires II

- In the case of terrain masking, these definitions apply to the bottom layer because that is where the terrain properties are inherited from.

- Forest Tree – Any tree-class object (including, but not limited to: as oak forest tree, pine tree, palm tree, reed, bush, etc.) placed on forest terrain such that it can be built over only after all its stored wood is removed.

- Support – The map loads properly and within 60 seconds for the given configurations/settings without crashing the game or failing to spawn any players. Such players receive the same number of resources, without bias in terrains, elevations, objects, etc. Does NOT mean that the configuration/settings are recommended by the creator, or predicted to result in an enjoyable or entertaining game. The map will load as requested and everyone will have the same potential for an equally wonderful or terrible experience.

2. **Overview**

This document defines the general characteristics of supplier-designed random map scripts used in Age of Empires II competitions.

3. **File**

Players need to be able to load the Random Map successfully, without excessive waiting for the file to transfer in lobby or parse during game start-up

3.A. Nature

The random map shall be contained in a single text file with .rms extension

3.B. No XS

The random map shall not reference or be influenced by e(x)ternal (s)ubroutines (XS).

3.C. Size

The total size of the containing file shall not exceed 2,500 kilobytes.

4. **Timing**

It is important that viewers of an AOE competition do not become bored and click away before action can begin. Within the first five minutes, players shall be capable of establishing both of the following:
- Resource income to sustain constant unit production.
- At least one production building from which those units may be generated.

5. **Player Setup**

This section describes the player starting conditions, including geometric arrangement of starting locations and changes to the game data that appear after the map loads.

5.A. Player Number & Teaming Configurations

Unfinished work should not be exhibited. At a minimum, the random map shall support the following common configurations:
1. 1v1 on a 2-player map size
2. 2v2 on a 4-player map size
3. 3v3 on a 6-player map size
4. 4v4 on an 8-player map size or "giant" map size

5. 2v2v2v2 on an 8-player map size or "giant" map size
6. "No Teams" or "Free-For-All" style, on a map size equal to the number of players, rounded up if there are an odd number of players.

5.B. Random Player Arrangement

Variety and exploration are important aspects of competitive Age of Empires. Therefore at least one of the following must be true to ensure sufficient randomness and create the need for players to adapt to scouting information:
1. The map is nomad, with town center location selected by the players.
2. Players shall be placed using "random_placement", or "grouped_by_team", in combination with "create_player_lands".
3. Players shall be placed using "direct_placement", with lands assigned using "assign_to". In this case, *each* player shall have at least eight unique starting locations that are more than 2% distant in both x and y coordinate from each other. Note that starting locations that could belong to other players are not counted in this variety. For example, if blue starts at [25,25] and red starts at [75,75], then a reversal where blue is at [75,75] and red is at [25,25] is not regarded as a contributor to starting location randomness, since this effect could be achieved by randomly assigning different colors to the *same location*.

5.C. Positional Fairness

The geometric center for each team's starting locations –if selected by the random map — shall be approximately equidistant from location [50,50] (the center of the map).

5.D. Team Positions

If the map is used in a team-game competition, then players will need to have an idea of who will be flank or pocket. When "team positions" is activated in lobby, a clockwise sweep from lowest number shall order the players as follows, in one of two configurations:
1. First Ordering: 1 (blue), 3 (green), 5 (cyan), and 7 (grey) against 2 (red), 4 (yellow), 6 (purple), and 8 (orange)
2. Second Ordering: 1 (blue), 3 (green), 5 (cyan), and 7 (grey) against 8 (orange), 6 (purple), 4 (yellow), and 2 (red)

If a linear pattern is used for player placement, then "clockwise" is simply "left to right".

5.E. Rule Changes

Game mechanics should be intuitive so that players are not discouraged from signing up for custom map competitions. Therefore, the following apply:

5.E.1. Guard State

The random map shall not invoke a "guard_state" to alter the mechanics or win conditions of the game.

5.E.2. Terrain State

The random map shall not alter the terrains suitable for the construction of new buildings using "terrain_state" or any equivalent command.

5.E.3. Game Rules

The random map shall not use "effect_amount" or "effect_percent" to invoke changes to player starting resources or general game rules.

5.E.4. Object Rules

The random map shall not use "effect_amount" or "effect_percent" to invoke rule changes that impact any player-controlled objects or gaia objects intended to interact with players, with the following exceptions:

a. The player is only able to control the unit by starting with it. The unit is un-trainable.

b. Each player gains the ability to build up to one thematic building in the Dark Age, meeting the below requirements:
   1. If the building is capable of producing villagers, then it shall cost no less than 275 wood and 100 stone, and have build time no less than 150 seconds.
   2. If the building is capable of producing fishing ships, then it shall cost no less than 150 wood, and have build time no less than 35 seconds.
   3. If the building is capable of producing military units, then it shall cost no less than 175 wood, and have build time no less than 50 seconds.
   4. If the building is capable of producing trade units, then it shall cost no less than 175 wood, and have build time no less than 60 seconds.
   5. If the building is capable of producing herdables (such as sheep, turkeys, etc.), then it shall cost no less than 100 wood, and have build time no less than 35 seconds.
   6. If the building is capable of providing population space, then it shall cost no less than 25 wood, and 25 seconds of build time, for every 5 population provided. E. G. A ten population hut requires 50 wood and 50 seconds to build using a single villager.
   7. Buildings with multiple capabilities, as listed above, shall have the cost and construction time of the most expensive option, plus ½ the cost and construction time of all other options added. For example, if a rule change would give players the ability to construct a building that can train villagers, military units, and herdables, then the cost of such a building would be (275 +175/2 + 100/2) wood = 413 wood and 100 stone minimum, with build time (150 + 50/2 + 35/2) second = 193 seconds minimum.

c. Each player gains the ability to train up to two thematic units at an appropriate building in the Dark Age, meeting the below requirements.
   1. Range shall not exceed 1.
   2. If a combat unit, unmitigated damage output (before armor of defending unit) shall not exceed 8 damage per second, per 80 resources of investment and 21 seconds of training time. Unit speed shall not exceed 0.9 tiles/second, and vision shall not exceed 4 tiles. Unit armor shall not exceed 0 melee, 1 pierce, and hit-points shall not exceed half of the unit's total resource cost.
   3. If a resource-collection unit, statistics (including training rate), shall not exceed those of their closest standard-rules analog.
   4. If a harvestable unit (such as sheep), then it shall yield food and cost no less

than ¼ that food yield in wood to produce. Training time shall be no less than 25 seconds for every 100 food contained in the unit. Other statistics shall not exceed those of the closest standard-rules analog.

6. **Land Generation**

The random map shall present an arrangement of neutral lands that are approximately equal in total distance from the geometric center of all team starting locations, illustrated per the example of Figure 6:

Acceptable	Acceptable	Unacceptable
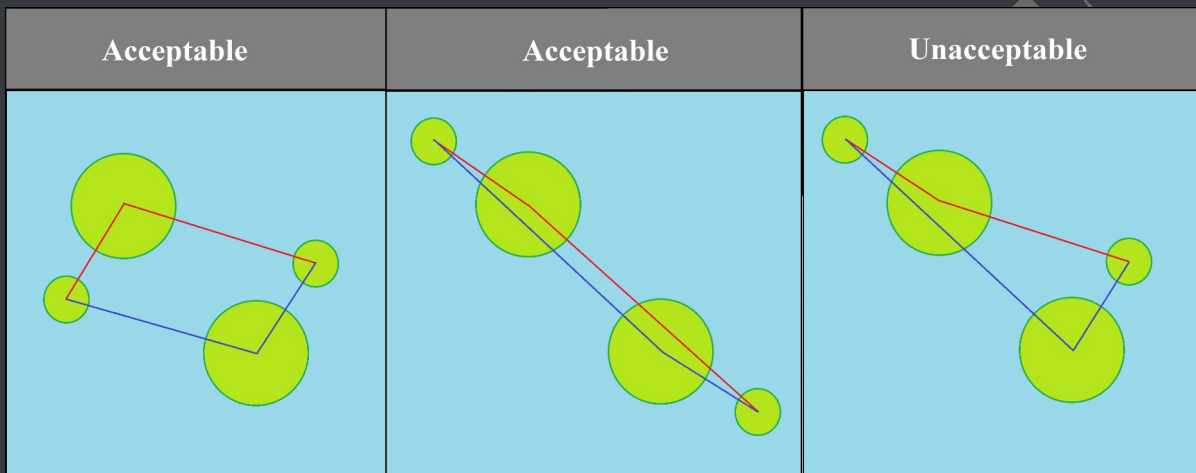
Figure 6: Example of Acceptable and Unacceptable Neutral Land Distribution

For the left and central panes in the above figure, the total distance of the blue lines and red lines are approximately equal. However, in the right pane, the sum of the blue lines is significantly larger than the sum of the red lines, which gives read an unfair –and unacceptable – advantage.

7. **Elevation Generation**

The random map should have a fair distribution of hills, whose heights are not so tall that screens may fail to render them:

7.A. Maximum Height

Maximum Elevation shall not exceed 16.

7.B. Fairness

Elevation shall be uniformly distributed across the random map, without bias toward any edge or team.

8. **Terrain Generation**

The random map should have a fair distribution of terrains, per the following:

8.A. Design Critical Terrains

The random map shall not bias any class of design-critical terrains in favor of any one team.

8.B. Forest Impingement

With exception of lumbercamps, forest trees shall avoid any starting building capable of producing units, being captured, and/or sending/receiving resources by at least 6 tiles.

8.C. Forest Access

The random map should provide equal access to forests. Players shall have approximately the same number forest trees within a 6 to 30 tile radius of any starting Town Center. Simple tree objects within this distance shall not exceed 2 per group, or constitute more than 10% of the unharvested wood within a 30 tile radius from the starting Town Center.

9. **Objects Generation**

The random map should have a fair distribution of useful objects, per the following:

9.A. Forbidden Objects

Object 444, known as "Town Center (Packed)" does not work in game as intended and is forbidden.

9.B. Player-Controlled Starting Objects

Objects that start the game under the control of players should meet the following requirements:

9.B.1. Equal Count

With exception of civilization-specific bonuses, the random map shall assure players the same quantity of starting units and buildings, including gaia objects immediately converted at the start of the game.

9.B.2. Equal Utility

Equal utility of starting objects shall be assured; no starting unit shall be entrapped by forests or other resources, and no starting building shall be pinned against trees or other resources, such that units created from it might be trapped.

9.B.3. Combat Units

Starting units with the ability to attack or convert cannot be allowed to pose a serious threat to an opponent's Dark Age economy. This includes units spawned through the deletion of a starting unit. Therefore:

a. Starting units capable of reaching enemy resource collection, (from being compatible with the same class of terrain) shall have range less than or equal to 1.

b. On maps where players start with a garrison-able building within 15 tiles of all villagers, the combined attack efforts of all starting military units shall be insufficient to kill a loomed villager (fighting back) at full health, even after achieving "the first hit".

c. On maps where players start without a garrison-able building within 15 tiles of all villagers, no starting military unit shall be capable of harming any villagers.

9.C. Gaia Objects

These objects start the game as neutral and are under the control of gaia. They can be resources, friendly, or hostile units/buildings. The following conditions apply:

9.C.1. Resources

The random map should have a fair distribution of resources, including (but not limited to) animals, forage bushes, gold and stone mines, fish, and relics. The following requirements apply:

9.C.1.a. Player-Assigned

Resources that are within 30 tiles of starting Town Centers are "player assigned". Each player shall receive the same number of such resources, at the same distances from the Town Center. NOTE: Nomad maps tend not to have Player-Assigned resources.

9.C.1.b. Neutral

Any resources on the map that are not "Player-Assigned" are called "Neutral", and tend toward lower scrutiny by nature of being less relevant to the early game (from being further away). Neutral resources shall exhibit no bias toward any team.

9.C.2. Gaia Convertible Objects

With the following exceptions, the random map shall have no convertible gaia objects:

d. The object is assured conversion at the start of the game, placed within the vision and capture radius of player-controlled objects.
e. The object is sheep class (such as sheep, turkey, llama, goat, etc.) such that gaining control of it due to random scouting is not regarded as a large advantage.
f. The object is a building of approximate equidistance from the team starting locations, that changes control depending on the player who was last closest to it (such as a monument).

9.C.3. Gaia Hostile Objects

Hostile Gaia Objects are unconvertible and may attack nearby player units or buildings. Gaia hostile objects shall avoid player starting Town Centers by 30 tiles minimum. If players do not start with a garrison-able building within 15 tiles of all villagers, then Gaia Hostile Objects are forbidden.

10. Regicide Game Mode

The random map shall support regicide mode.

11. Artificial Intelligence

The random map shall be playable by standard AOE2DE artificial intelligence.

12. **Popular Visual Mods**

The random map shall support the following popular visual mods, without failing to render any terrain or objects:

- 2698 – Age of Cubes Standard Resolution
- 1371 – Simplistic Terrain Colors
- 1205 – Useless Plants Remover
- 790 – Small Trees
- 2695 – Improved Small Trees
- 22014 – Identical Pine Trees with Grid Shadow
- 22781 – Selected Small Trees with Grid Shadow

13. **Trade Configuration**

When the "Low Resources" option is selected in lobby, the random map shall disable trade cart and trade cog units and all associated buildings/technologies, at the market and dock respectively, Neither human nor AI players shall be capable of producing such units in that case. No other effect shall be produced from selecting "Low Resources", such as decreasing the number of resource piles on the map or giving players a nomad start.

Revision	Description	Change Document	Date (YYYY-MM-DD)
X1	Advanced release for community review/feedback.	N/A	2024/06/08
X2	Incorporated feedback from Zetnus	N/A	2024/06/09